

# BOTANICAL ABSTRACTS

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FOR EDITORIAL AND BUSINESS NOTICES, SEE THIRD COVER PAGE



## CONTENTS

Agronomy.....	933-1002
Bibliography, Biography and History.....	p. 154
Botanical Education.....	1003-1013
Cytology.....	p. 155
Ecology and Plant Geography.....	p. 156
Forest Botany and Forestry.....	1014-1027
Genetics.....	1028-1068
Horticulture.....	1069-1105
Morphology, Anatomy and Histology of Vascular Plants.....	1106-1125
Morphology and Taxonomy of Algae.....	1126-1129
Morphology and Taxonomy of Bryophytes.....	1130-1134
Morphology and Taxonomy of Fungi, Lichens, Bacteria and Myxomycetes.....	1135-1206
Paleobotany and Evolutionary History.....	1207-1219
Pathology.....	1220-1365
Pharmaceutical Botany and Pharmacognosy.....	1366-1396
Physiology.....	1397-1509
Soil Science.....	p. 250
Taxonomy of Vascular Plants.....	p. 250
Miscellaneous, Unclassified Publications.....	1510-1531

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# BOTANICAL ABSTRACTS

A monthly serial furnishing abstracts and citations of publications in the international field of botany in its broadest sense.

UNDER THE DIRECTION OF

THE BOARD OF CONTROL OF BOTANICAL ABSTRACTS, INC.

J. R. SCHRAMM, Editor-in-Chief  
National Research Council, Washington, D. C.

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FEBRUARY, 1923

No. 2

ENTRIES 933-1531

## AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 1033, 1046, 1048, 1052, 1058, 1062, 1064, 1116, 1229, 1292, 1302, 1368, 1419, 1420, 1423, 1427, 1447, 1461, 1473, 1476, 1478, 1479, 1489, 1490, 1493, 1495, 1497, 1512)

933. ANONYMOUS. Candle-nut oil. Agric. Bull. Federated Malay States 9: 176. 1922.—A description is given of the process of extracting oil from the candle-nut.—*I. H. Burkill.*

934. ANONYMOUS. Napier fodder. Rhodesian Agric. Jour. 19: 194-199. 1922.—Extracts are given of reports from various sources of elephant grass (*Pennisetum purpureum* Schumacher (*P. Bentharii* Steudel)), the Napier fodder of Rhodesia. Napier fodder, which attains a height of 15-18 feet, shows an aptitude for growing on poor soil and though not as palatable as many other well known grasses, cattle do well on it. Records show that cows fed on Napier fodder and allowed to graze occasionally on natural pastures maintain milk yields and butter fat tests. Pulp from which good quality paper is manufactured has been obtained in Uganda from Napier fodder although at present export of the raw material would be unprofitable.—*L. J. Goldblatt.*

935. ANONYMOUS. Pasture plants and grasses in Rhodesia. Results of further trials. Rhodesia Agric. Jour. 19: 439-443. 1922.—Reports, compiled by the Chief Agriculturist, are given from farmers who tested the following: Rhodesian tussock grass, Penhavanga grass, Kikuyu, Kudzu vine, swamp couch grass, Buffel grass, *Paspalum dilatatum*, Napier fodder, *Phalaris bulbosa*, native *Paspalum*, and Florida beggar weed.—*L. J. Goldblatt.*

936. ANONYMOUS. Varieties of maize. Recommendations by the Department of Agriculture. Agric. Gaz. New South Wales 33: 549-551. 1922.—Twelve maize districts are given for New South Wales. Maize varieties are grouped geographically relative to earliness of the variety, use of the crop, and character of the soil.—*L. R. Waldron.*

937. ANONYMOUS. Varieties of potatoes. Recommendations by the Department of Agriculture. Agric. Gaz. New South Wales 33: 552. 1922.—Varieties for New South Wales are classified geographically and according to earliness.—*L. R. Waldron.*



938. ARNOLD, H. C. Propagation of Kudzu vine (*Pueraria Thunbergiana*). Rhodesia Agric. Jour. 19: 435-438. 1922.—Kudzu vines may be propagated either from seed or by rooted layers from the parent stock. In the latter case much less labor is entailed if unrooted slips are detached from the parent stock and planted in the permanent site. When the plant has become established, runners are sent out in all directions; in order to prevent patchiness these should be buried 1-2 inches as they grow, and within a foot of the growing tips.—L. J. Goldblatt.

939. BOSMAN, G. J. Potato culture. Jour. Dept. Agric. Union South Africa 5: 41-49. 1922.—An outline is given of the origin, history, and importance of the potato. The following points in potato culture are dealt with: climatic adaptations; soil requirements and preparation; planting; cultivation; manurial requirements; rotation; the seed; and the improvement of the stock.—L. Goldblatt.

940. BREAKWELL, E. Some useful introduced fodder plants. Agric. Gaz. New South Wales 33: 485-490. 2 fig. 1922.—Notes and descriptions are given for tagasaste (*Cytisus proliferus*), sainfoin (*Onobrychis sativa*), sulla (*Hedysarum coronarium*), teosinte (*Euchlaena luxurians*), Japanese clover (*Lespedeza striata*), Kudzu (*Pueraria Thunbergiana*), and sheep's burnet (*Poterium sanguisorba*). These plants are not commonly grown in New South Wales.—L. R. Waldron.

941. BREAKWELL, E. Some useful saltbushes. Agric. Gaz. New South Wales 33: 571-577. 7 fig. 1922.—Saltbushes of Australia belong mainly to the following 5 genera,—*Chenopodium*, *Atriplex*, *Kochia*, *Rhagodia*, and *Euchlaena*. Because of free-seeding and rapid-growing habits, ranging tracts carrying saltbushes are quickly brought to use after periods of drought. *Chenopodium atriplicinum* attains a height of 3-4 feet. *Atriplex nummularia* produces fodder in comparative abundance. Transplanted seedlings grew to a height of 10 feet at Nyngan during the summer of 1921-22 and 56 pounds of green feed per plant were obtained. Plants should be planted 12 feet apart. *A. leptocarpa* is not very palatable. *A. semibaccata* has been introduced successfully into California. Analyses are given of *A. nummularia*, *A. halimoides*, *A. angulata*, *Rhagodia parabolica*, and *R. hastata*.—L. R. Waldron.

942. BRUTSCHKE, FRITZ. Zur Förderung der landwirtschaftlichen Erzeugung. [Increasing agricultural production.] Mitteil. Deutsch. Landw. Ges. 37: 521-522. 1922.—A general plea is made for greater production and for economy in the use of seed.—A. J. Pieters.

943. BURTT DAVY, JOSEPH. Fermentation products from maize. South African Jour. Indust. 5: 245-254. 1922.—This article describes the use of maize starch in the production of fermented liquids, such as, beer, whisky, gin, brandy, vinegar, and especially industrial alcohol. Details of the manufacture and the various uses of the latter are very fully given.—Sydney M. Stent.

944. BURTT DAVY, JOSEPH. Starch and glucose from maize. 2 and 3. South African Jour. Indust. 5: 177-183, 217-222. 1922.—The process is described whereby starch is extracted from the grains of maize (*Zea Mays* L.) and converted into glucose. Various useful commodities are cited into the composition of which glucose largely enters.—Sydney M. Stent.

945. BURTT DAVY, JOSEPH. The uses of maize husks, cobs and chaff. South African Jour. Indust. 5: 407-413. Pl. 3. 1922.—The author describes the employment of maize husks in the manufacture of hats, mats, and other articles of domestic use; also the manufacture of gas for illuminating and heating purposes, pipes, charcoal, and stock-food from the cobs.—Sydney M. Stent.

946. BURTT DAVY, JOSEPH. Utilization of maize flowers, stalks and leaves 2. South African Jour. Indust. 5: 357-364. 1922.—This installment contains further information



regarding the utilization of maize stalks as a source of sugar, and refers to the published results of experiments by Stewart and Kerr, Blackshaw, and others on the possibility of increasing the sugar-content of the stalk. The use of maize straw in the manufacture of paper is also dealt with in detail.—*Sydney M. Stent.*

947. CLIFFORD, WALTER. Straw pulp as a substitute for groundwood for newsprint. *Paper Indust.* 3: 1105-1106. 1921.—The author urges the utilization of straw in place of wood and gives a description of a sulphate process for cooking straw.—*H. N. Lee.*

948. DAWSON, C. A. Crop production on small holdings 5. Lucerne. *South African Fruit Grower* 9: 127-129. *Fig. 1-4.* 1922.—Lucerne is considered the most suitable crop for extensive field culture under irrigation wherever soil and climatic conditions are suitable to its production.—*L. Goldblatt.*

949. DAWSON, C. A. Crop production on small holdings 6. Beans. *South African Fruit Grower* 9: 173. 1922.—Beans are usually grown as a green vegetable rather than for the dry seed, though the 2 could profitably be combined. For export, white beans are preferable to colored varieties. To prevent weevil infestation, dry beans should either be fumigated with carbon bisulphide or mixed with  $\frac{1}{3}$  as much air-slaked lime, agricultural lime, or fine dry dust, followed by washing and sifting.—*L. Goldblatt.*

950. DOUGLASS, J. Field experiments with maize. Wollongbar experiment farm. *Agric. Gaz. New South Wales* 33: 464. 1922.—Maize from graded seed, planted as a fodder crop, outyielded similar ungraded seed by nearly 5 tons of green fodder, about 50 per cent per acre.—*L. R. Waldron.*

951. DOWNING, R. G., and L. G. LITTLE. Field experiments with oats. Nine years' results, 1912 to 1920. Glen Innes experiment farm. *Agric. Gaz. New South Wales* 33: 465-468. 1922.—Notes and yields are given for 12 varieties. Algerian is considered the best general variety. Fulghum variety shows promise; Kherson is not satisfactory; and a hull-less variety has proved to be of little value. Late varieties, represented by White Tartarian, have only limited application.—*L. R. Waldron.*

952. DOWNING, R. G., and L. G. LITTLE. Field experiments with oats. Results of seven years' trials with fertilizers. Glen Innes experiment farm. *Agric. Gaz. New South Wales* 33: 609-613. 1922.—In a 3-year rotation, oats, pasture crop, and maize for silage, fertilizers were applied to the oats at time of planting. The fertilizers—sulphate of ammonia or dried blood, superphosphate, and sulphate of potash—were used singly and variously combined in comparison with check plots. Any combination, without superphosphate, had only slight effect. Fertilizers were applied at the rate of  $2\frac{1}{2}$  pounds of nitrogen, 15 pounds phosphoric acid, and 6 pounds potash per acre. Best results were obtained with a complete fertilizer, which increased the yield per acre nearly 40 per cent over the check plot. The annual net monetary gain per acre brought about by the use of a complete fertilizer was \$7.32 in the production of oat hay and \$5.76 for threshed oats.—*L. R. Waldron.*

953. EATON, B. J., F. DELA M. NORRIS, D. H. GRIST, and J. N. MILSUM. [Editors.] *Malayan agriculture.* Dept. Agric. Federated Malay States and Straits Settlements: Kuala Lumpur, 1922.—The handbook indicates the present condition of agriculture in the Malay Peninsula and discusses plans for its improvement.—*I. H. Burkill.*

954. FALKE. Die Bewirtschaftung der Wiesen und Weiden. [The management of meadows and pastures.] *Arbeit. Deutsch. Landw. Ges.* 314. 54-79. 1921.—About  $\frac{1}{3}$  the area of cultivated land in Germany is in meadows; the average yield is about 5000 pounds per acre. This low average yield forms the text for a discussion of methods of improving the meadows. The 1st part of the paper is virtually a review of one by Ahr on the fertilizing of



meadows [see Bot. Absts. 9, Entry 285]. The relative merits of seeding on old meadows or plowing and re-seeding are discussed and 3-, 4-, and 5-year rotations are suggested, together with grass and clover seed mixtures for wet, moist, and dry lands. In the 2nd section the author discusses fertilizing pastures, utilization of feed produced, and gives tables and graphs showing gains made by young cattle on stable feed and on pastures, both with and without concentrates. The treatment of sheep pasture is discussed, and grass mixtures for lamb pastures are suggested.—*A. J. Pieters.*

955. GEORGI, C. D. V. Some plant oils of Malaya, their extraction and uses. *Malayan Agric. Jour.* 10: 34-42. 1922.—The oil-yielding plants of the Malay Peninsula are discussed.—*I. H. Burkill.*

956. GOW, C. Wild oats. *Agric. Gaz. New South Wales* 33: 541-544. 1922.—Practical notes on control are given for *Avena fatua*.—*L. R. Waldron.*

957. GRIST, D. H., and SYED ABDUL RAHMAN. The cultivation of *Tenggala padi*. *Agric. Bull. Federated Malay States* 9: 5-22, 131-153. 1921.—*Tenggala padi* is rice planted in a rotation on ploughed land, *tenggala* meaning a plough. The method is the most scientific one used by the Malays. The most common rotation is 4 years cropping and 4 years fallow. The processes of the rotation are described. Improvement must proceed along 3 lines, (a) improvement of the races of rice, (b) manuring for the rejuvenation of the land, and (c) improvement in the methods of manipulation. Catch crops and cover crops are then considered and experiments with them described.—*I. H. Burkill.*

958. GUTHRIE, F. B., and G. W. NORRIS. Notes on wheats entered for the Royal Agricultural Society's show. Easter, 1922. *Agric. Gaz. New South Wales* 33: 497-504. 1922.—One hundred entries were distributed among 11 classes. The wheat variety *Quality*, from California, had maximum weight of 68 pounds per bushel. *Florence* stood highest in percentage of flour produced, and *Cedar* ranked highest in per cent gluten and water absorption. A table is appended giving weight, gluten, and flour strength for the show wheats since 1905.—*L. R. Waldron.*

959. HALL, E. H. Sulphur and nitrogen content of alfalfa grown under various conditions. *Bot. Gaz.* 73: 401-411. 1922.—The analytical method in sulphur analysis used was the "peroxide method" described in the U. S. Bureau of Chemistry Bulletin No. 107. For the sulphate sulphur the Ames method was employed. Total nitrogen was determined by the Arnold-Gunning method and nitrate nitrogen by Koch's modification of the Schlesing-Wagner method. The writer's summary of results is as follows: Alfalfa hay grown in various parts of the U. S. A. shows considerable difference in the percentage of total sulphur content, quite independent of sulphur fertilization. In general, hay from fields with the heaviest crop contains the highest percentage of sulphur. Good to excellent crops of alfalfa hay remove annually from 37 to 90 pounds of sulphur per acre, an amount which would seem far in excess of the amount returned by rain. In some samples all, and in every sample more than 90 per cent, of the total sulphur was in organic form. There was none or little sulphur present in excess of the actual needs as building material.—*B. W. Wells.*

960. HENRICK, J. O. The cultivation of rye. *Agric. Gaz. New South Wales* 33: 483-484. 1922.—The average annual rye acreage in New South Wales is less than 4000. It is used mainly for early winter feed in areas low in production and as a green manure crop on very poor soils. Cultural notes are given.—*L. R. Waldron.*

961. HOUSER, TRUE. New cigar tobacco varieties. *Monthly Bull. Ohio Agric. Exp. Sta.* 6: 135-138. 1921.—A large number of new varieties of tobacco have been bred and tested during the past 18 years at the Ohio Agricultural Experiment Station. *Montgomery Seedleaf* (hybrid 199), *Tall Zimmer* (hybrid 224), and *Ohio Binder* (hybrid 77) have met with much



favor. Characteristics and merits of each variety and tables showing production records are given.—*R. C. Thomas.*

962. HUTCHESON, T. B., and T. K. WOLFE. Silage experiments. Virginia Agric. Exp. Sta. Bull. 227. 16 p. 1922.—Silage crops included in the tests were corn, sorghum, soy beans, cowpeas, and millet. Corn and soy beans were superior to the other crops from the standpoint of highest yields of tonnage and total nutrients. Soy beans outyielded corn on the basis of total nutrients, but used alone did not make good silage. It was found that the best silage is obtained with a mixture of soy beans and corn, not more than 1 part of soy beans to 1 part of corn. The 2 crops may be grown together or in separate fields. The best corn varieties for silage purposes are Cocke's Prolific, Virginia Ensilage, and Pamunkey Ensilage. The best soy bean varieties for the separate sections of the state are those varieties best adapted for hay production in the section.—Information on culture and harvesting are included.—*F. D. Fromme.*

963. JURITZ, C. F. Prickly pear as a fodder for stock. Union South Africa Dept. Agric. Sci. Bull. 16. 15 p. 1920.—Prickly pear is of some value as an accessory food supply during periods of drought, while at other times it is of advantage as a roughage for cattle and ostriches. A number of analyses are given of the green plant, air-dry plant, and fruit. It is not a suitable constituent for ensilage. The spines may be singed off before feeding. A summary is given of experiments with prickly pear as a stock feed in India and Australia. *E. M. Doidge.*

964. JURITZ, F. The nicotine-content of South African tobacco. Jour. Dept. Agric. Union South Africa 4: 552-562, 1922; also South African Jour. Indust. 5: 347-356. 1922.—With the idea of establishing a tobacco extract factory in the Piet Retief district, tables are given of the analyses of tobaccos from different districts. The tobaccos are classed as "heavy" or "light" according to the amount of nicotine contained. The conclusions drawn from the series of investigations are: (1) The heavy South African tobaccos contain in their air dried leaves from 3 to 5 per cent of nicotine; (2) the lighter tobaccos do not as a rule yield much above 2 per cent and frequently fall below 1 per cent; (3) the leaves of the common wild tobacco (*Nicotiana glauca*) apparently contain considerably below 1 per cent nicotine; (4) the most promising results are those obtained from *N. rustica*, the leaves of which have yielded as much as 6 and 8 per cent and even more of nicotine. All parts of the plant contain nicotine, but it is found mainly in the leaves.—*L. Goldblatt.*

965. KERLE, W. D. Farmers' experiment plots. Maize experiments, 1921-22. Upper north coast district. Agric. Gaz. New South Wales 33: 617-621. 1922.—Cooperative trials were conducted upon 9 private farms. The variety Craig Mitchell gave the maximum yield of 84 bushels. Mineral fertilizers gave markedly increased yields over no fertilizer in most cases.—*L. R. Waldron.*

966. KOCH, PIETER. Conservation of soil moisture in relation to Turkish tobacco culture. Jour. Dept. Agric. Union South Africa 4: 319-328. Fig. 1-6. 1922.—In the Western Province, Turkish tobacco is grown as a dry land crop. Owing to the hot and dry climate during the growing season soil moisture must be conserved. This is done by deep ploughing in early winter; by maintaining the productivity of the soil; by increasing the humus content by ploughing in a green crop or stable and kraal manures at least every 4th season; and by frequent and proper cultivation after the crop has been planted. In an appendix the rainfall recorded at Elsenburg during 1919 and 1921 and the average for 17 years are given.—*L. Goldblatt.*

967. LEMMERMANN. Neuzzeitliche Düngungsfragen. [Modern fertilizer questions.] Arbeit. Deutsch. Landw. Ges. 314. 80-100. 1921.—The author points out that during the 25 years prior to 1913 the yields of potatoes and grains increased because of the increased use



of fertilizers. From 1913 to 1919 yields declined as follows; bread grains 21.3 per cent, fodder grain 24.2 per cent, potatoes 31 per cent. Besides discussing the use of fertilizer, the author mentions the effect of light on plant growth and advises that drill rows be made north and south so as to receive most light. He reviews the work of Borneman and of himself on fertilizing with carbon dioxide [see Bot. Absts. 8, Entry 32], but the main part of the paper is concerned with a discussion of the profitableness of using nitrogen, phosphoric acid, and potash at prevailing prices of fertilizers and of grains.—A. J. Pieters.

968. LITTLE, L. G. Field experiments with sunflowers. A comparison with maize for silage. Glen Innes experiment farm. Agric. Gaz. New South Wales 33: 622-624. 1922.—Each crop was sown at the rate of 15 pounds of seed per acre in 35-inch rows using 70 pounds of superphosphate per acre. Sunflowers were cut in full flower and maize at the best silage stage. Sunflowers yielded 7 tons and maize 3.8 tons per acre. According to analyses of the silage, maize carried more water, less protein, less ether extract, and more fiber than the sunflowers.—L. R. Waldron.

969. McCauley, C. Field experiments with wheat, 1921. Cowra experiment farm. Agric. Gaz. New South Wales 33: 545-548. 1922.—Wheat was planted both early and late for grain and hay. Cowra No. 29 yielded highest for grain in the early planting, and in the late planting trial, Canberra held this rank in grain production.—L. R. Waldron.

970. MAINWARING, C. The common sunflower (*Helianthus annuus*). Rhodesia Agric. Jour. 19: 295-301. Fig. 1-2. 1922.—The chemical composition and the methods of cultivation of the sunflower are given. The sunflower is a dry-land crop and is more resistant to heat and drought than maize. Where the first consideration is to produce a crop either for cash or for feeding purposes, maize is considered more profitable, especially in the richest districts; but in drier portions of Rhodesia sunflowers are more likely to flourish and prove profitable.—L. J. Goldblatt.

971. MAINWARING, C. The ground nut or monkey nut. Rhodesia Agric. Jour. 19: 150-158. Pl. 1-4. 1922.—The author discusses the cultivation of *Arachis hypogaea*. Climatic conditions over the whole of Rhodesia are favorable for its growth. Spanish Bunch and Virginia Bunch have proved superior croppers and best suited to local conditions over a number of seasons. The oil, which is obtained in large quantities, is used in the preparation of food stuffs, leather dressing, furniture creams, hair and cosmetic oils, etc., and for illumination. Shelled ground nut oil-cake contains 10 per cent of fat and 46 per cent of albuminoids (protein), thus making it a highly concentrated cattle feed.—L. J. Goldblatt.

972. MASCHHAUPT, J. G. De invloed van grondsoort en bemesting op het gehalte onzer landbouwgewassen aan stikstof en aschbestanddeelen. [Influence of soil and fertilizing on nitrogen and ash constituents.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 25: 115-130. 1921.—In these experiments of 1918, winter wheat was used on experimental plots representing 5 kinds of soil,—heath sand, peat-moor, marsh soil, gravel-sand, and clay soil. Whereas the influence of nitrogen fertilizers on nitrogen and ash of the plants had been studied earlier, the present investigations were on the influence of potassium and phosphoric acid fertilizers. Four procedures were used: (1) nitrogen only, (2) complete fertilizer (nitrogen, potassium, phosphorus), (3) nitrogen and potassium, (4) complete fertilizer with double portion of potassium. The following observations were made: The greatest weight (79.63 kgm.) per hectoliter wheat was obtained from marsh soil, the smallest (76.58 kgm.) from gravel-sand; the weights from peat-moor, heath sand, and clay were respectively 78.36, 77.16, and 77.14 kgm. Soil seems to have a distinct influence on weight of the grain. Grain from marsh soil was glassy and from gravel-sand, mealy,—a difference undoubtedly connected with the high nitrogen content of the former and the low nitrogen content of the latter. Doubling the potassium in the complete fertilizer was without effect. In heath sand, just as much N and K<sub>2</sub>O were taken out of the soil as were added in the fertilizers, whereas in the other soils



much more was taken out than put in. Less than half the added phosphorus was taken out. The amounts of silica taken from gravel-sand and clay are considerable. Much less N is taken up than is usually supposed.—In another experiment, a higher calcium carbonate content of the soil had no influence. Beets grown on "young" clay rich in  $\text{CaCO}_3$  had a higher N,  $\text{P}_2\text{O}_5$ , MgO, and  $\text{K}_2\text{O}$  content, a very much higher Cl and  $\text{Na}_2\text{O}$  content, but a much lower CaO content than those grown on "older" clay soil containing less  $\text{CaCO}_3$ . The same relation was found by an analysis of oat plants grown on "schuimaarde" (approximately  $\frac{3}{4}$  of which is  $\text{CaCO}_3$ ) and "old" clay soil. A very much greater nitrogen content was found, partly as nitrates and partly as ammonia. The CaO contents in comparison with other constituents were quite low. MgO was taken up in relatively increased amount, as was nitrogen.—A German résumé concludes the paper.—*Peter J. Klaphaak.*

973. MOE, CARL. Utilization of lime sludge. Paper 29<sup>13</sup>: 11-12. *Fig. 1-2*. 1921.—Lime sludge from a sulphate pulp mill gave very much better results than commercial limestone when applied to fields in preparation for planting of corn and clover.—*H. N. Lee.*

974. MOOMAW, LEROY. Report of the Dickinson substation for the years 1920 and 1921. North Dakota Agric. Exp. Sta. Bull. 160. 32 p. 5 fig. 1922.—Results of 13 years' cropping are given for spring wheat, oats, and barley on disced corn ground; on spring-plowed grain-stubble land in comparison with fall-plowed; after clean fallowed land; and following a green manuring crop. The following are the respective average yields for spring wheat from the 5 methods: 18.7, 15.2, 15.6, 21.1, and 16.8, bushels per acre. The use of a bare summer fallow has not been justified and the use of a green manuring crop has shown no positive results.—Wheat continuously cropped for 13 years averaged 13 bushels per acre in comparison with 22.5 bushels from wheat alternately cropped with summer fallow.—During 15 years, including 1 year of hail loss, shelled corn has averaged 11.3 bushels per acre. The average for 8 of these years, when corn was mature enough to husk, was 21.2 bushels.—Monad and Kubanka durum wheats have significantly outyielded the best varieties of common wheats. The best varieties of winter wheat have yielded considerably less than varieties of common spring wheat.—Dakold rye is more productive than other varieties.—Midseason oats have outyielded early and late varieties.—The 2-rowed barleys Hannchen and Swan Neck [Svanhals] have outyielded all 6-rowed varieties.—Proso millet is less productive than other grain crops.—Notes and yields are given of grasses, alfalfa, field peas, roots, and other forage crops.—In a 5-year test Burbank and Irish Cobbler outyielded other potato varieties.—*L. R. Waldron.*

975. NEWTON, W. Why grow sweet clover? Agric. Jour. [British Columbia] 7: 106. 1922.—Sweet clover has not given very good results in the coast regions, perhaps because the soils are usually slightly acid. It is better adapted to conditions in the interior of the province.—*J. W. Eastham.*

976. OLSON, EDGAR. The demonstration farms, 1921. Sixteenth annual report. North Dakota Agric. Exp. Sta. Bull. 163. 54 p. [1922.]—Detailed yields and culture methods, with costs of production, are given for 20 demonstration farms for 1921. The crops dealt with are durum and common wheat, oats, barley, corn, flax, potatoes, alfalfa, and sweet clover. A 10-year summary of results is given for the Lakota farm. Alfalfa on this farm has made a greater net return than any other crop, including wheat.—*L. R. Waldron.*

977. OOSTHUIZEN, J. DU P. Different methods of curing tobacco. Jour. Dept. Agric. Union South Africa 5: 131-150. *Fig. 1-12*. 1922.—The article discusses the different methods of curing tobacco (air-curing, sun-curing, fire-curing, and flue-curing) and its preparation for market. Most of the tobacco grown in the Union is air-cured, which is hazardous because of the weather. The quality of the tobacco produced in the Union can be improved, although the value of good quality leaf is sometimes reduced during curing. The climate of South Africa is favorable for air-curing, although during the wet seasons much better results could be obtained by the use of artificial heat in air-curing or by flue-curing.—*L. Goldblatt.*



978. PARISH, E. Agricultural experiment, its design and interpretation. Union South Africa Dept. Agric. Sci. Bull. 22. 21 p. 1922.—The variation in yield of single plots similarly treated is so great as to render valueless comparisons made from the result of single plot trials; similarly with experiments with small numbers of animals, owing to the high variation of the individual. Replication in agricultural experiments is absolutely necessary. In field trials the replication of the plots must be systematic and so designed as to obviate the effect of progressive differences in the soil; no appreciable increase in reliability is gained by enlarging plots beyond  $\frac{1}{40}$  of an acre.—*E. M. Doidge*.

979. PARISH, E. Causes of the high cost of production of maize and the remedy. Jour. Dept. Agric. Union South Africa 4: 417-429. Pl. 1-3. 1922.—The high cost of maize production may be considered under the following heads, for each of which the remedy is given: (1) low yields; (2) high cost of labor and high cost of grazing of oxen, costly methods of ploughing, and method of payment of native labor; (3) lack of diversity of crops resulting in an uneconomical use of labor; (4) high cost of management; (5) over capitalization in land or men resulting in excessive overhead charges; (6) farming on borrowed capital at high rates of interest; (7) non-use of fallows and winter-ploughing system of farming; (8) faulty utilization of farm products; (9) other considerations including area of land worked per implement; life of implements; investment per 100 acres of maize; and ingenuity.—*L. Goldblatt*.

980. PHILLIPS, E. P. A possible cattle food (seeds of *Sesbania cinerascens* Melw. and *S. mossambicensis* Klotz.). Jour. Dept. Agric. Union South Africa 4: 361-365. Fig. 1. 1922.—Twenty-three species of *Sesbania* are recorded in Africa, of which 6 occur in South Africa. Chemical analyses are given of *S. mossambicensis* and *S. cinerascens*, which have possibilities as feeding stuffs of high feed value if they prove harmless to animals. Merchants report that *S. mossambicensis* might be utilised in place of peas, lentils, and millet.—*L. Goldblatt*.

981. PITT, J. M. Farmers' experiment plots. Potato trial, 1921-22. Central coast. Agric. Gaz. New South Wales 33: 471-475. 1 fig. 1922.—Cooperative experiments were conducted by 13 farmers. Application of phosphatic fertilizers gave an economic increase of yield. Varieties Carman and Up-to-date gave comparatively high yields. Spacing and size-of-tuber experiments were conducted on 1 farm.—*L. R. Waldron*.

982. POLE EVANS, I. B., and K. A. LANSDELL. The Galinsoga weed (*Galinsoga parviflora* L.). Union South Africa Dept. Agric. Bull. 1920<sup>7</sup>: 1 pl. 1920.—The plant is described and illustrated by a colored plate.—*E. M. Doidge*.

983. POLE EVANS, I. B., and K. A. LANSDELL. The purple stinkweed (*Datura tatula*). Union South Africa Dept. Agric. Bull. 1920<sup>8</sup>: 1 pl. 1920.—The plant is described and illustrated by a colored plate.—*E. M. Doidge*.

984. POLE EVANS, I. B., and K. A. LANSDELL. The sow thistle (*Sonchus oleraceus*). Union South Africa Dept. Agric. Bull. 1920<sup>6</sup>: 1 pl. 1920.—The plant is described and illustrated.—*E. M. Doidge*.

985. POLE EVANS, I. B., and K. A. LANSDELL. The upright star-burr (*Acanthospermum hispidum* D.C.). Union South Africa Dept. Agric. Bull. 1920<sup>8</sup>: 1 pl. 1920.—The plant is described and illustrated by a colored plate. Means of eradication are suggested.—*E. M. Doidge*.

986. PRIDHAM, J. T. Climate in our relation to our wheat. Agric. Gaz. New South Wales 33: 469-470. 1922.—Certain areas of New South Wales are suitable for successful growth of semi-hard wheats such as Hard Federation. Since such varieties bring better prices overseas it is suggested that farmers might capitalize this fact where climatic conditions warrant.—*L. R. Waldron*.



987. PRIDHAM, J. T. Oats on the wheat farm. Agric. Gaz. New South Wales 33: 615-616. 1922.—Storage of oats on farms is discussed.—*L. R. Waldron*.

988. RINDL, M. Mafura tallow. A product of the nuts of *Trichilia emetica*. South African Jour. Indust. 5: 415-423. 1922.—Mafura nuts are a valuable potential oil seed of which fairly large quantities are available from trees growing wild in Portuguese East Africa. The possibility of profitably cultivating the tree in places easily accessible by rail or barge is suggested. The high melting point of the tallow makes it valuable for the candle industry, but its value as a soap stock, as well as for food and other purposes, still needs investigating. The entire export of this nut from Portuguese East Africa in 1913 was valued roughly at £45,000.—*Sydney M. Stent*.

989. RITTER, KURT. Deutschlands Wirtschaftslage und die Produktionssteigerung der Landwirtschaft. [The economic condition of Germany and the increase in agricultural productivity.] Landw. Jahrb. 57: 285-397. 1922.—A detailed study of the present economic condition in Germany is presented with the conclusion that only an increased agricultural productivity will save Germany in the next few years from famine. The author discusses in detail the condition of agricultural economy in relation to an increase in productivity and suggests means for bringing about the latter.—*Selman A. Waksman*.

990. SCHOLER, J. K. Field experiments with wheat, 1921. Coonamble experiment farm. Agric. Gaz. New South Wales 33: 477-482. 1922.—Trials were duplicated on the farm upon red and black soils. Varieties sown on the heavy black soil of the open plain country had their yields much reduced because of attacks of rust [*Puccinia graminis*]. Varieties sown on the red sandy loam of the wilga and pine country did not suffer from rust attacks.—*L. R. Waldron*.

991. SEELHORST, VON. Ackerbaufragen. [Problems in field culture.] Arbeit. Deutsch. Landw. Ges. 314. 3-24. 1921.—The author discusses the problems of green manuring, artificial fertilizers, and cultivation with various tools and machines.—*A. J. Pieters*.

992. SHEPHERD, A. N. Farmers' experiment plots. Green fodder trials, 1921-22. Murrumbidgee irrigation areas. Agric. Gaz. New South Wales 33: 639-641. 1922.—Notes are given on manurial and variety trials with maize, sorghum, and Sudan grass.—*L. R. Waldron*.

993. SHEPHERD, A. N. Fodder crops for dairy farmers. Murrumbidgee irrigation area. Agric. Gaz. New South Wales 33: 625-628. 1922.—Practical cultural notes are given for various fodder crops for the region indicated.—*L. R. Waldron*.

994. SKIBBE, ARTHUR, and JACQ P. F. SELLSCHOP. Some fodder plants and feeding stuffs. Their culture and chemical composition. Jour. Dept. Agric. Union South Africa 4: 338-349. Pl. 1. 1922.—The results are given of experiments conducted at Potchefstroom on the adaptability of various uncommon forage crops to the soil and climate of this area of the Transvaal. The description, uses, etc., and tables showing the chemical composition and cultural methods are given of the following: Dhal bean (*Cajanus indicus*), chick pea (*Cicer arietinum*), Sesbania (*Sesbania aculeata*), Tepary beans (*Phaseolus acutifolius*), tick bean (*Vicia Faba*), peanuts or monkey-nuts (*Arachis hypogaea*), Sudan grass (*Sorghum sudanense*), and Napier fodder (*Pennisetum purpureum*).—*L. Goldblatt*.

995. SOUTH, F. W. The possibilities of developing roselle fibre as a cottage or other industry in the F.M.S. Agric. Bull. Federated Malay States 9: 23-26. 1921.—The author describes the growth of *Hibiscus Sabdariffa* var. *altissima* and its possibilities as a fiber crop.—*I. H. Burkill*.

996. SPRING, F. G. Cover-crops and clean-weeding. The butterfly pea (*Centrosoma Plumieri*) and giant mimosa (*Mimosa incisa*). Agric. Bull. Federated Malay States 9: 169-



174. 1922.—The action of these 2 plants in preventing and in keeping down weeds is described. The Sarawak bean (*Dolichos Hosei*) is more partial to particular soils. *Dolichos biflorus* continues upon the ground for a shorter period.—*I. H. Burkill*.

997. STEVENS, O. A. North Dakota weeds. North Dakota Agric. Exp. Sta. Bull. 162. 44 p., 45 fig. 1922.—Nine pages are devoted to a general discussion of weeds. The remainder of the bulletin is devoted to individual discussion and illustration of 30 important weeds of the state, each considered under description, distribution, habits, and control.—*L. R. Waldron*.

998. TICE, C. Seed-certification work reviewed. Agric. Jour. [British Columbia] 7: 102-103. 1 fig. 1922.—The work done in British Columbia on the certification of seed potatoes in 1921 is summarized.—*J. W. Eastham*.

999. WENHOLZ, H. Alteration of names of maize varieties. Agric. Gaz. New South Wales 33: 544. 1922.—The varieties from the U. S. A. known as Northwestern Dent and U. S. 133 are renamed Sundown and Early Morn, respectively.—*L. R. Waldron*.

1000. WHITTET, J. N. A new method of harvesting grain sorghum seed. Agric. Gaz. New South Wales 33: 556-557. 3 fig. 1922.—Sorghum was harvested and threshed by the reaper-thresher in 1 operation.—*L. R. Waldron*.

1001. WHITTET, J. N. Kikuyu grass (*Pennisetum clandestinum*) in Queensland. Agric. Gaz. New South Wales 33: 578. 1922.—A farmer's note is given on the plant under cultivation.—*L. R. Waldron*.

1002. ZADE. Futterbau und Futterpflanzen Züchtung. [Forage culture and the breeding of forage plants.] Arbeit. Deutsch. Landw. Ges. 314. 43-53. 1921.—This general paper calls attention to the importance of high grade seeds in the production of forage crops. The author mentions several registered strains and discusses the causes for the lack of demand for highly bred forage crop seeds. Some suggestions are made for growing and harvesting grass seed.—*A. J. Pieters*.

## BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

C. W. DODGE, *Editor*

(See in this issue Entries 1029, 1320, 1348)

## BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ARTHUR H. GRAVES, *Assistant Editor*

(See also in this issue Entries 1034, 1397, 1399)

1003. CHURCH, A. H. Elementary notes on conifers. Bot. Mem. [Oxford] 8. 32 p. 1920.—Fifteen lecture and laboratory schedules are presented.—*E. Philip Smith*.

1004. CHURCH, A. H. Elementary notes on the systematy of angiosperms. Bot. Mem. [Oxford] 11. 71 p. 1921.—This comprises 34 lecture and laboratory schedules, arranged as an introduction to the study of flowers.—*E. Philip Smith*.

1005. CHURCH, A. H. Form-factors in Coniferae. Bot. Mem. [Oxford] 9. 28 p. 1920.—This is arranged as a supplement to a preceding memoir [see Bot. Abstrs. 12, Entry 1003].—*E. Philip Smith*.



1006. CHURCH, A. H. *Introduction to the systematy of Indian trees.* Bot. Mem. [Oxford] 12. 50 p. 1921.—This contains 16 lecture schedules.—*E. Philip Smith.*

1007. [D., F. A.] *The Dark Ages: a survival in Kentucky.* Nature 109: 669-670. 1922.—This refers to proposed legislation to prohibit teaching of evolution. "A more disastrously retrograde step in education could scarcely be imagined."—*O. A. Stevens.*

1008. ELFORD, P., and S. HEATON. *Practical school gardening.* 2nd ed., 22 p. Clarendon Press: Oxford, 1921. 3s. 6d.

1009. G[ATES], R. R. [Rev. of: (1) FRITCH, F. E., and E. J. SALISBURY. *Botany for students of medicine and pharmacy.* xiv + 357 p. G. Bell and Sons: London, 1921. (2) WOODHEAD, T. W. *Junior botany.* 210 p. Clarendon Press: Oxford, 1922 (see Bot. Absts. 11, Entry 3461). (3) BALLARD, C. W. *The elements of vegetable histology.* xiv + 246 p. John Wiley and Sons: New York; Chapman and Hall: London, 1921.] Nature 109: 773. 1922.—The reviewer regards the first 2 as good, the last as very poor. [See also Bot. Absts. 10, Entries 32, 1602.]—*O. A. Stevens.*

1010. SCHMITT, CORNEL. *Wie ich Pflanze und Tier aushorche.* [How I inquire of plant and animal.] 128 p., 57 fig. Datterer & Co.: München, date?

1011. SCHNEIDER, HANS. *Die botanische Mikrotechnik. Ein Handbuch der mikroskopischen Arbeitsverfahren.* [Handbook of botanical microtechnic.] 2nd ed. of the work by A. ZIMMERMANN of the same title. xii + 458 p., 220 fig.. Gustav Fischer: Jena, 1922.—This edition is practically a new book in which the extensive articles on microtechnic published since the appearance of the 1st edition are incorporated. A noteworthy addition is a section on the theory of light stated as briefly as possible for use in practical work. A preliminary chapter deals with the microscope and its use. Part 1 takes up free hand technic; killing and fixing; staining and mounting of plant tissues; and the apparatus used in photographing, counting, and projection of mounted specimens. Part 2 deals with the most important qualitative microchemical methods for testing plant substances; Part 3, with the cell wall; Part 4, with the protoplast and its contents; and Part 5, with special methods for the study of the members of different plant groups.—*Lillian C. Cash.*

1012. STANFORD, E. E. *Some functions of botany in the pharmaceutical curriculum.* Jour. Amer. Pharm. Assoc. 11: 446-449. 1922.—Calling attention to the lack of observation and initiative of the present day students the author emphasizes the value of a course in botany to stimulate and to increase the power of observation for the many research problems confronting workers of today.—*Anton Hogstad, Jr.*

1013. T., R. J. *Strasburger's textbook of botany.* [Rev. of: LANG, W. H. *Strasburger's textbook of botany.* 5th English ed. revised with 14th German ed. by FITTING, H., L. JOST, H. SCHENCK, and G. KARSTEN. xi + 799 p. Macmillan and Co.: London, 1921.] Nature 109: 740-741. 1922.—It is stated that the main defect is the undue compression which various sections have suffered. [See also Bot. Absts. 11, Entry 1101.]—*O. A. Stevens.*

## CYTOLOGY

G. M. SMITH, *Editor*

(See in this issue Entries 1011, 1041, 1068, 1178, 1181, 1345, 1441, 1448, 1484)



## ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEO. D. FULLER, *Assistant Editor*

(See in this issue Entries 1017, 1021, 1024, 1110, 1111, 1120, 1121, 1125, 1131, 1132, 1134, 1171, 1173, 1174, 1186, 1199, 1203, 1205, 1406, 1422, 1452, 1486, 1491)

## FOREST BOTANY AND FORESTRY

J. S. ILLICK, *Editor*

(See also in this issue Entries 1114, 1269, 1278, 1283, 1314, 1329, 1367)

1014. ANONYMOUS. Pulp and pulpwood decay. *Paper Indust.* 3: 589-593. 1921.—This contribution by the American Paper and Pulp Association gives descriptions of the uses of various preservatives together with results obtained. Sodium fluoride gives the best results, with borax a close second.—*H. N. Lee.*

1015. BLAIR, R. J. Molding of chemical wood pulp with suggestions as to control. *Pulp and Paper Mag.* 20: 429-431. *Fig. 1-4.* 1922.

1016. DALRYMPLE-HAY, R. Report of the Forestry Commission for New South Wales for the year ending June 30, 1921. 18 p. Sydney, New South Wales, 1921.—During the year 1,096 acres were planted at a direct cost of £3,160, and an additional 1,705 acres were prepared for planting. Substantial progress was also made in marking boundaries of State forests, constructing roads and fire breaks, and permanent improvements necessary for administrative purposes. The area of forest under systematic fire protection is 759,000 acres out of a total of 5,194,000 of state forests, plus 1,536,000 acres of timber reserves. During the year 140,944 acres were put under working plans, bringing the total to date up to 875,037, and 36,000 acres of natural forest were treated for regeneration. The gross revenue was £190,742, the administrative expense £57,835, and expenditure on forest works £104,782. The value of imported timber was £2,073,046, and of exported £464,725. Detailed data on all activities and costs are given in a comprehensive series of tables. The total production of native timber was 155,114 M superficial feet, and total consumption 352,882 M. Progress has been made in botanical studies, in securing data on valuable exotics for introduction, and on use of certain woods for pulp. A valuable feature of the report is the graphic summary of the principal data.—*S. B. Shaw.*

1017. DURLAND, WILLIAM DAVIES. The forests of the Dominican Republic. *Geog. Rev.* 12: 206-222. 1922.—Fully  $\frac{3}{4}$  of the 19,000 square miles of the republic can be classed as timberland. The island is rough and rugged with 4 principal mountain ranges, the highest of which attains an elevation of over 8000 feet. Rainfall is heavy (60 inches + per year) and well distributed. The forests are generally tropical in character and, except for a few of the most valuable species, are little known. A generalized type map recognizes the following principal cover types: (1) evergreen hardwood, (2) partly evergreen hardwood, (3) pine, (4) thorn, (5) savanna, (6) mostly deciduous, (7) littoral hardwood. Much of the exploitation has been in the partly evergreen hardwood type, and especially in the pine type. The general characters of each type are described. The pernicious practice of "comico making," or clearing of forest for temporary agricultural use, is of considerable importance in the republic. A partial list of the trees of the island is included.—*S. B. Shaw.*

1018. ELLIS, L. MACINTOSH. New Zealand Forest Service. Report for the year ending March 31, 1921. 20 p. Wellington, New Zealand. 1921.—The year is characterized as one of stock-taking, of study of conditions and problems, and the creation of the Forest Service for administration of forests and woodlands, which now total 6,800,000 acres. Seven forest



conservation regions have been established. The policy contemplates scientific management, systematic protection, planting on all Crown forest lands, establishment of a forest school, and promotion of research. The Forest Service at present has a force of 97. General reconnaissance of several of the principal mountain ranges was made. Receipts and expenditures are given in detail, and a general summary from 1896 to date showing total revenue at £32,040 per year against £23,570 expense. A total of 2,500,000 acres of timberland has been destroyed by fire; this loss continues at the annual rate of 50,000 acres. A total of 38,461 acres has been planted since 1896. Total production of lumber for the year was 309,162 M superficial feet. It is urgently recommended that all available Crown forest land be dedicated as provisional state forest. Detailed summaries of the afforestation work show special measures taken to protect plantations from fire, that 520,000 trees were planted by ranchers, etc., during the year; while 2,877,000 were planted on state forests on 1,381 acres. Data on export and import of timber are given.—*S. B. Show.*

1019. GRIFFITH-BOSCAWEN, ARTHUR, and G. G. LEVESON GOWER. *The Ninety-ninth Report of the Commissioners of H. M. Woods, Forests and Land Revenues [Great Britain] for the Year ending March 31, 1921.*—The total income for the year was £11,234, 645, of which £100,494 was from timber, the balance from agricultural and house property, mines, interest, etc. The expenditures were £549,314, of which £68,365 was for planting and preparation of timber for sale. In accordance with various acts of Parliament, expenditures, incomes, leases, rents, etc., are given in great detail. There is no information of consequence on progress of forestry; the report gives only business details.—*S. B. Show.*

1020. HOWE, C. D. *The performance of culled acre.* Paper 27<sup>23</sup>: 11-13. 1921.—In 1 acre taken as an average sample of a large area the following conditions have been determined. About 50 years ago 5 white pine trees yielded 2,500 feet of lumber. There is no white pine in any stage of growth now. Two cuttings 26 and 16 years ago yielded 6.5 cords of pulpwood. Depletion of the growing stock during logging, absence of proper gradations of diameter classes, absence of adequate reproduction, and influence of hardwoods make it improbable that such a yield will be repeated naturally. Eight years ago 2.5 cords of balsam fir pulpwood were cut and 24 years after that cutting it is estimated that 3.5 cords will be available. Proper handling will allow young spruce and balsam trees to develop a good commercial stand.—*H. N. Lee.*

1021. KINDLE, E. M. *Notes on the forests of southeastern Labrador.* Geog. Rev. 12: 57-71. 1922.—There is sharp contrast between the desolate, treeless shore strip, due to year-round presence of ice in adjacent waters, and the heavily forested interior. The seaward edge of the forest consists of stunted and dwarfed black spruce (*Picea mariana*), but the timber increases in height inland to an average of 50-60 feet. Much of the timber is large enough for lumber production, but the bulk is more suitable for pulpwood. Exploitation has just begun. Data are given on individual large trees.—*S. B. Show.*

1022. MARTIN-ZEDE. *De l'influence de l'orientation sur les succès de la transplantation des arbres.* [The influence of orientation on the success of transplanting trees.] Compt. Rend. Acad. Sci. Paris 174: 61-63. 1922.—Work done on the island of Anticosti with species of fir, larch, spruce, and birch showed that trees do better if transplanted with their south side towards the south etc.; 50 per cent were found to be successful with this method as opposed to 6-8 per cent set without reference to orientation.—*C. H. Farr.*

1023. NEILSON, MAURICE. *The utilization of jack pine in the manufacture of newsprint.* Paper Indust. 3: 1510-1513. 1922.—A complete description is given of actual use of *Pinus divaricata* in the manufacture of sulphite and groundwood pulp.—*H. N. Lee.*

1024. NOVAKOVSKY, STANISLAUS. *Climatic provinces of the Russian far east in relation to human activity.* Geog. Rev. 12: 100-115. 1922.—Forests of the region are described incidentally to a study of climate.—*S. B. Show.*



1025. SUTERMEISTER, E. The use of rotten and stained wood for making sulphite pulp. *Pulp and Paper Mag.* 20: 513-514. 1922.—Experiments showed that partially rotted spruce wood which is still moderately firm will yield 767 pounds of pulp per 100 cubic feet of actual wood, while sound spruce wood yields 956 pounds. The fiber from the rotted wood was weak and of very poor color. The outer part of spruce logs, especially if river driven, are discolored to a grayish brown; there is no decrease in yield of fiber due to this, but the pulp from the discolored wood requires much more bleach to produce a good white pulp.—*H. N. Lee.*

1026. WEST, C. J. Paper making trials at the Imperial Institute. *Paper* 28<sup>11</sup>: 28-31; 28<sup>12</sup>: 25-27, 29. 1921.—Work done since about 1912 at the Imperial Institute, South Kensington, is reviewed.—*H. N. Lee.*

1027. WILLIAMS, C. O. The composition of Natal wattle bark. III. Union South Africa Dept. Agric. Bull. 1920<sup>1</sup>: 14 p. 1920.—Mature wattle bark loses about  $\frac{1}{2}$  its weight during drying. The total amount of bark and of tanning material increases with the age of trees, but the percentage of tanning matter is approximately the same. Coast trees mature more rapidly but are inferior to those grown in the Midlands. In the commercial samples of solid wattle extracts manufactured in Natal, the proportion of tanning matter varies from 59 to 67 per cent.—*E. M. Doidge.*

## GENETICS

ORLAND E. WHITE, *Editor*

See also in this issue Entries 950, 1118, 1119, 1123, 1124, 1141, 1178, 1181, 1204, 1286, 1302, 1412, 1434, 1447, 1474, 1475, 1483, 1484, 1497)

1028. ANONYMOUS. Breeding wheat to resist rust. *Northwest. Miller* 126: 296. 1921.—The writer reviews addresses by W. P. THOMPSON and W. P. FRASER at Saskatoon, April, 1922. Thompson has tested, in field and greenhouse, hundreds of varieties from all parts of the world. Less than a dozen showed true resistance and none of these was a common wheat of spring type. Crossing experiments showed that resistance is inherited like other agronomic characters. A number of hybrids appeared resistant until 1919, when attacked by forms of stem rust not previously encountered at Saskatoon. Further breeding work, to secure resistance also to these forms of rust is being carried on.—Fraser is investigating methods of over-wintering of stem rust to determine the origin of spring infection. He has no direct evidence that the spring infection arises from the barberry. Eight forms of stem rust have been isolated in Canada and there is evidence of several others. In connection with the rust investigations, rows of varieties of common spring wheat, durums, and emmers, which are known to have some resistance, were seeded at various stations throughout western Canada.—*J. B. Harrington.*

1029. ANONYMOUS. The genetics of vegetables. *Gard. Chron.* 71: 146. 1922.—The Royal Academy of Belgium offers a triennial prize of 2,500 francs, to be known as the Prix Joseph Schepkens, for the best experimental work on the genetics of vegetables.—*L. R. Detjen.*

1030. ANONYMOUS. The value of selection and breeding. *Agric. Gaz. New South Wales* 33: 732. 1 chart. 1922.—Results from Hawkesbury Agricultural College egg-laying contests for 20 years are shown graphically for (a) 10 leading pens (60 birds), (b) 10 lowest pens (60 birds), and (c) for the whole competition. Gradual increase in eggs laid is noted.—*L. R. Waldron.*

1031. AAMODT, OLAF S. Correlated inheritance in wheat of the winter-spring habit of growth and rust resistance. *Phytopathology* 12: 32-33. 1922.—Kanred, a winter wheat, is resistant to several biologic forms of stem rust to which Marquis, a spring wheat, is sus-

ceptible. Seed of an  $F_2$  Marquis-Kanred cross was sown in the spring at St. Paul, Minnesota, and the resulting plants placed in 9 groups, according to time of heading. Seven of these 9 groups set seed and were tested in  $F_3$ . All individuals of the earliest-heading  $F_2$  group bred true for spring habit. In the other 6 groups the percentage of spring plants in  $F_3$  was in direct relation to the time of heading of the  $F_2$  group. The segregation for rust, on  $F_3$  seedlings with a single known biologic form, approximated a ratio of 3 resistant to 1 susceptible. This ratio was about the same for all heading periods.—J. A. Clark.

1032. AAMODT, OLAF S. The inheritance of resistance to several biologic forms of *Puccinia graminis tritici* in a cross between Kanred and Marquis wheats. *Phytopathology* 12: 32. 1922.—Kanred, a winter wheat, was found immune, and Marquis, a spring wheat, susceptible. In a cross between these varieties, greenhouse studies of  $F_3$  seedlings proved the plants to be either immune or completely susceptible. There were no intermediates. Immunity was dominant. The results of inoculation experiments indicated that apparently a single factor determines the reaction to several biologic forms. Families homozygous for spring habit and rust resistance were obtained in the  $F_3$  generation.—J. A. Clark.

1033. ARMSTRONG, S. F. The Mendelian inheritance of susceptibility and resistance to yellow rust (*Puccinia glumarum*, Erikss. et Henn.) in wheat. *Jour. Agric. Sci.* 12: 57-96. 1922.—Work of other investigators, indicating that susceptibility and resistance to *Puccinia glumarum* is a heritable character in wheat, is substantiated. Results indicate a single factor difference. In a cross of a susceptible wheat  $\times$  resistant wheat, the  $F_1$  gave susceptibility of an intermediate nature.—Environmental conditions materially influence the degree of infection, but the relative difference in susceptibility and resistance remains approximately the same. Evidence is presented that genetic factors for other plant characters may modify the expression of the factor for susceptibility and resistance.—Selection from a variety containing both resistant and susceptible plants isolated 2 pure strains, one homozygous for resistance, the other homozygous for susceptibility. Both selections appeared to be morphologically identical, differing only in resistance to rust. Under rust conditions the resistant strain gave about 50 per cent higher yield than the susceptible strain.—H. E. Brewbaker.

1034. BAUR, ERWIN. Die wissenschaftlichen Grundlagen der Pflanzenzüchtung. Ein Lehrbuch für Landwirte, Gärtner und Forstleute. [The scientific principles of plant breeding. A text book for agriculturists, gardeners, and foresters.] 1st & 2nd ed., v + 120 p., 6 pl. 11 fig. Gebrüder Borntraeger: Berlin, 1921.—In this popular presentation of the fundamentals of genetics applied to agriculture, the topics of variation, reproduction, inbreeding, and natural selection are covered briefly. Variations are classified as modifications due to environment, combinations following hybridization, and mutations. Reproduction is classified as asexual, sexual, and parthenogenetic. The reducing effects of inbreeding are made clear by data from the snapdragon and illustrated by the comparative size of 3 generations of inbred kale plants. Natural selection is shown to adapt various strains of cultivated plants to different conditions. Cultivated plants are classified into 4 groups: vegetatively reproduced, naturally self-fertilized, and naturally cross-fertilized plants which can be artificially inbred and those which can not. The application of methods of improvement to these 4 groups is illustrated by systems of breeding representative plants in each group. [See also Bot. Absts. 11, Entry 2472.].—D. F. Jones.

1035. BECKER, J. Über Vererbungsgesetze bei Gurken. [On laws of inheritance in cucurbits.] *Zeitschr. Pflanzenzücht.* 8: 290-293. 1922.—Attempts to produce xenia between squashes and melons through artificial cross pollination completely failed. Reports of xenia between these plants are probably due to the melon-like taste, odor, and color sometimes noted in very ripe squashes.—In a cross between a squash with short and yellow fruits and another with long and white fruits, the  $F_1$  was found to have white fruits of intermediate length. The  $F_2$  fruits were approximately 9 white and long; 3 yellow and long; 3 white and short; and 1 yellow and short. The  $F_1$  and  $F_2$  were raised in relatively poor soil, so that plants with the



fruit-size of the large parent (which normally grows in very rich soil) never reappeared.—*E. W. Sinnott.*

1036. BLARINGHEM, L. Note préliminaire sur l'hérédité de la prolifération et de la duplication chez *Cardamine pratensis*. [Preliminary note on the heredity of proliferation and double flowers in *C. pratensis*.] Bull. Soc. Path. Veg. France 9: 138-144. 1 fig. 1922.—The author crossed the common *Cardamine pratensis* L. with a double-flowering form, each strain having been derived from a single individual. The  $F_1$  progeny were similar, with dominance of the single flower character. Eight  $F_1$  plants gave only sterile fruits, while 101 gave fruits with seeds. Of the 101, 94 appeared normal; while 7 gave fruits all or in part proliferated, their inflorescences appearing as a mosaic made up in part of an inflorescence with fruits of the common *Cardamine* and in part of an inflorescence with proliferated ovaries. In the same ovary, the two characters may be juxtaposed. This is an example of Naudinian heredity.—*J. Dufrenoy.*

1037. BLOSSFELD, ROBERT. Die hauptsächlichsten Orchideen-Hybriden. [The principal orchid-hybrids.] Gartenwelt 25: 122-124, 155-157. 1921.—Examples of bigeneric crosses are *Adioda* = *Ada* × *Cochlioda*; *Anoetomaria* = *Anoetochilus* × *Haemaria*; *Brassocattleya* = *Brassovola* × *Cattleya*; *Epicattleya* = *Epidendrum* × *Cattleya*; *Oncidioda* = *Oncidium* × *Cochlioda*; *Schombocattleya* = *Schomburgkia* × *Cattleya*; *Zygobatemannia* = *Zygopetalum* × *Batemannia*. The following are trigeneric: *Brassocattlaelia* is a product from *Brassovola*, *Cattleya*, and *Laelia*; *Diacattlaelia*, from *Diacrum*, *Cattleya*, and *Laelia*; *Lowaria*, from *Brassovola*, *Saphronitis*, and *Laelia*; *Vuylstekaeria*, from *Cochlioda*, *Miltonia*, and *Odontoglossum*.—Most *Brassocattleyas* which are products between *Brassovola Digbyana* and either *Cattleya aurea*, *C. Dowiana*, *C. Gaskelliana*, *C. labiata autumnalis*, *C. Mendeli*, *C. Mossiae*, *C. speciosissima*, or *C. trianae*, and the natural hybrid *C. Hardyana* are characterized by large flowers and very large and fringed labellum. *Brassovola Digbyana* usually produces 1 flower on each stalk, *Cattleya* of the *Labiata* group usually 3-4, and *Brassocattleyas* usually 2.—In crosses between *Brassovola Digbyana* and *Cattleyas* many characters of the former are dominant; in crosses between *B. Digbyana* and *Cattleya Dowiana* and its variety *aurea* many characters of the latter are dominant, especially the yellow color of the sepals and petals and the deep purple of the labellum. One cross between *C. Mossiae* and *C. gigas* does not flower, another flowers about July 1, and another about February. *C. Fredeekiae* (= *C. Mossiae* × *C. aurea*) flowers in the spring. The following results of crosses between white-flowering *Cattleyas* were obtained: *C. Mossiae alba* (*Wagnerii*) with *C. Gaskelliana alba* and *C. intermedia alba* produces only white flowering individuals. *C. Gaskelliana* × *C. intermedia alba*, *C. Schroederiae alba*, or *C. Harrisoniana alba* produces only lavender colored offspring. *C. Mossiae alba* (*Wagnerii*) × *C. gigas* Frau Melanie Beyrodt (with white sepals and petals and purple labellum) produces some albinos and some lavender flowers. *C. gigas* Frau Melanie Beyrodt × *C. aurea*, *C. Warneri alba* × *C. Gaskelliana alba*, and *C. gigas* Frau Melanie Beyrodt × *C. Gaskelliana alba* give the same results. The crosses *C. labiata alba* × *C. labiata alba* (Cookson) and *C. intermedia alba* × *C. Warneri alba* (Peeters) produce lavender colored flowers. *Laelia purpurata* and *L. tenebrosa* are generally used in crosses with *Cattleya*. Yellow flowered *Laeliocattleyas* are obtained by using as one parent *Laelia cinnabarina*, *L. flava*, *L. harpophylla*, or *L. xanthina*. *Saphronitis grandiflora*, with pure red flowers, has much influence on crosses with *Laeliocattleya*. *Epidendrum* has been crossed with *Saphronitis* (= *Epiphronitis*).—*J. C. Th. Uphof.*

1038. BRINK, R. A. The genetic basis for improvement in self-fertilized crops. Sci. Agric. 2: 83-87. 1921.—Essential features of the paper are (1), a review of the development of genetic thought as it has affected breeding practice with autogamous plants; (2) a discussion of a heretofore unemphasized property of pure lines.—Assuming that degressive mutations in pure lines occasionally occur, it is shown mathematically how the degressive strain gradually diminishes in proportion and thereby tends to be eliminated from the mixture with the original pure line.—*H. E. Brewbaker.*

1039. BUCHHOLZ, JOHN T. Developmental selection in vascular plants. Bot. Gaz. 73: 249-286. 28 fig. 1922.—Developmental selection consists of interovular (between ovules in same ovary) selection, embryonic (between embryos) selection, gametophytic (between male gametophytes such as pollen tubes and female gametophytes in same ovule) selection, and gametic (between gametes) selection. These are distinguished from natural selection. Selection between vegetatively branching parts is held to be intermediate, i.e., part developmental and part natural selection. Developmental selection as treated by the author has naught to do with such theoretical considerations as that of germinal selection. The data of conspicuous cases of polyembryony (sporophyte) and gametophytic selection are brought together. The author states that a good selective process has the following requirements: It should (1) start the competition simultaneously, (2) take place under uniform conditions, (3) measure comparable merit, and (4) rigidly eliminate the great majority that fall below the standard. The author holds that developmental selection much excels natural selection in meeting these requirements. Developmental selection may act upon very small quantitative characters, which situation may furnish a basis for selection of larger and more significant characters through linkage. Thus "the mechanism of developmental selection looks very promising as a means of accounting for many orthogenetic phenomena." Further, developmental selection may have a prominent rôle to play in the phenomena of variation and mutation. As regards the latter the discovery and recognition of them "depends upon whether they reappear in the next life cycle and thus pass the censorship of the developmental selection machinery."—*B. W. Wells.*

1040. COBB, FRIEDA. A case of Mendelian inheritance complicated by heterogametism and mutation in *Oenothera pratincola*. Genetics 6: 1-42. 1921.—A number of strains, all morphologically alike, of *O. pratincola* have been isolated. Strain E is genetically different from the other strains, of which strain C is a typical example. Strain E produces 4 types of revolute-leaved mutations not produced by other strains. Mut. *formosa* E is the most fertile and typical of the revolute-leaved series. Reciprocal crosses of mut. *formosa* E with f. *typica* E show matroclinic inheritance. Strain C  $\times$  mut. *formosa* E gives matroclinic progeny. Reciprocal cross mut. *formosa* E  $\times$  strain C gives F<sub>1</sub> of f. *typica* (flat-leaved) plants, and Mendelian segregation in F<sub>2</sub> of 3 f. *typica*: 1 mut. *formosa*.—Hypothesis of heterogametism offered in explanation of the phenomena assumes the occurrence of 2 types of gametes in *O. pratincola*,  $\alpha$  gametes (usually female) and  $\beta$  gametes (usually male), the  $\alpha$  gametes carrying some factors not represented in the  $\beta$  gametes. The zygote is formed by union of  $\alpha$  gamete of pistillate parent and  $\beta$  gamete of staminate parent. The zygote in turn produces  $\alpha$  (female) and  $\beta$  (male) gametes. In a cross the hybrid is unaffected by the nature of  $\beta$  of its pistillate parent, or  $\alpha$  of its staminate parent. In addition to the characteristic  $\alpha$  or  $\beta$  part, each gamete carries a group of factors common to both. At reduction,  $\alpha$  and  $\beta$  behave as units; that is, there is no interchange of factors or chromosomes between characteristic  $\alpha$  and  $\beta$  portions, each passing into the gametes (the  $\alpha$  into the female, the  $\beta$  into the male) just as it entered the zygote from its parent. Chromosomes carrying factors common to both  $\alpha$  and  $\beta$  portions of zygote show Mendelian segregation at the reduction division, each member of homologous pairs accompanying with equal frequency the  $\alpha$  or  $\beta$  portions. Factors belonging to the  $\alpha$  or  $\beta$  portions are inherited matroclinically or patroclinically, respectively; factors belonging to homologous and freely segregating chromosomes common to both  $\alpha$  and  $\beta$  gametes are inherited in a Mendelian manner.—F. *typica* E produces mut. *formosa* by a change in a factor in the  $\alpha$  portion of the  $\alpha$  gamete (female) having no counterpart in the  $\beta$  portion of the  $\beta$  gamete (male). The mutated  $\alpha$  gamete of mut. *formosa* is designated  $\alpha^1$ ; the  $\beta$  gametes of f. *typica* E and mut. *formosa* are equivalent. If mut. *formosa* is the pistillate parent in cross with f. *typica* E, the hybrid receives the  $\alpha^1$  gamete of mut. *formosa* and is similar to mut. *formosa*; in the reciprocal cross the progeny receive the  $\alpha$  gamete of *O. pratincola* and the progeny are all in the f. *typica*. Strain C differs from strain E by having, in addition to the factor for flatness in the  $\alpha$  portion of the  $\alpha$  gamete, a freely segregating, dominant (Mendelian) factor (*F*) for flatness present in both the  $\alpha$  and  $\beta$  gametes, of which the recessive allelomorph (*f*) is carried by strain E ( $\alpha\beta ff$ ). Mutation of the  $\alpha$  portion of f. *typica* C ( $\alpha\beta FF$ ) to  $\alpha^1$ , if it occurs, would



be masked by the presence of Mendelian factor for flatness ( $F$ ) in the remaining portion of the gamete. In strain E the change is visible since the Mendelian factor is present in the recessive form ( $f$ ). Strain C ( $\alpha \beta FF$ )  $\times$  mut. *formosa* E ( $\alpha^1 \beta ff$ ) gives flat-leaved  $F_1$  ( $\alpha \beta Ff$ ) in which segregation of the Mendelian factors takes place in the  $F_2$  but is masked by the presence of a factor for flatness in the  $\alpha$  portion of the zygote. The genotypes and the ratio in which they occur are:  $1 \alpha \beta FF : 2 \alpha \beta Ff : 1 \alpha \beta ff$ . The plants are all flat-leaved. In the reciprocal cross the  $F_1$  zygote ( $\alpha^1 \beta Ff$ ) is flat-leaved due to the presence of the dominant Mendelian factor  $F$  received from the staminate parent, the factor for revoluteness carried by the  $\alpha^1$  portion of the zygote being masked. In the  $F_2$  a ratio of 3 flat-leaved plants ( $1 \alpha^1 \beta FF : 2 \alpha^1 \beta Ff$ ): 1 revolute-leaved plant ( $\alpha^1 \beta ff$ ) was obtained. The new f. *typica* plants occurring in the  $F_2$  of this cross ( $\alpha^1 \beta FF$  and  $\alpha^1 \beta Ff$ ) are designated f. *typica* M. In 1919, Cobb and Bartlett reported [see Bot. Absts. 3, Entry 2100] that the pollen of mut. *latifolia* C was equivalent to that of its parent, f. *typica* C. The same paper recorded results of crossing mut. *formosa* within strain E and demonstrated inheritance to be matroclonic. Mut. *formosa* E  $\times$  mut. *latifolia* C gave  $F_1$  of 209 plants, all flat-leaved; in  $F_2$  4759 flat-leaved to 1633 revolute leaved plants were obtained, i.e., a ratio of 2.9:1. The present paper reports that mut. *formosa* E  $\times$  f. *typica* C gave  $F_1$  of 100 plants, all flat-leaved.  $F_2$  contained 2399 flat-leaved and 875 revolute-leaved plants; i.e., a ratio of 2.74:1. Self-pollination of f. *typica* plants from  $F_2$  of mut. *formosa* E  $\times$  mut. *latifolia* C gave in  $F_3$  22 non-segregating to 41 segregating progenies, approaching closely the expected 2:1 ratio. In segregating  $F_3$  progenies the ratio of flat- to revolute-leaved plants was 3.08:1.  $F_4$  and  $F_5$  have shown a continuance of the Mendelian behavior of this cross. Four recessive, revolute-leaved plants from  $F_2$  of cross mut. *formosa* with mut. *latifolia* C gave in  $F_3$  69 plants, all revolute-leaved. Reciprocal cross, f. *typica* C  $\times$  mut. *formosa* E ( $\alpha \beta FF \times \alpha^1 \beta ff$ ) gave all flat-leaved plants in the  $F_1$  of 782 individuals. In the  $F_2$ , 1654 plants were grown. Segregation of the Mendelian factors for flatness ( $F$  and  $f$ ) had taken place in the  $F_2$  but was masked by the ever present  $\alpha$  factor for flatness inherited matroclinically. Revolute character can appear only by mutation from  $\alpha$  to  $\alpha^1$  in plants of constitution  $\alpha \beta ff$ , or  $\frac{1}{2}$  the progeny. Sixteen revolute plants in  $F_2$ , or 16 per 1000, were found.—Nine crosses mut. *formosa* E  $\times$  f. *typica* E ( $\alpha^1 \beta ff \times \alpha \beta ff$ ) gave  $F_1$  of 305 plants, all revolute-leaved. Four  $F_1$  plants gave  $F_2$  of 628 plants, all revolute-leaved. Reciprocal cross f. *typica* E  $\times$  mut. *formosa* E had been shown in previous paper to be matroclonic.—Data concerning  $F_1$  and  $F_2$  of 18 different kinds of crosses involving f. *typica* M as one parent, and f. *typica* C., f. *typica* E, or mut. *formosa* as the other parent, confirm the author's hypothesis of non-equivalent gametes and the presence of a pair of independent Mendelian factors in *O. pratincola*. The author points out that  $\alpha$  of strain C may mutate to  $\alpha^1$  but in pure strain C the mutant type will find no expression until inhibiting Mendelian factors ( $FF$ ) are removed by hybridization, as happens when strain C is crossed with mut. *formosa*. In this case hybridization apparently induces mutation when as a matter of fact hybridization has only made possible the appearance of changes that occurred in the past. It is not known whether strain E arose by change in dominant Mendelian factors  $FF$  to  $ff$ , or whether the reverse took place to form strain C. It is supposed that other strains of *O. pratincola* have factors  $FF$  as none of them throws revolute-leaved mutations. The reverse mutation can take place in that mut. *nitidissima*, a type originating in the experiment garden from strain E, is a homozygous dominant for the Mendelian factors for flatness. "This paper records the case of a single unit character of the zygote, revoluteness, determined by a complicated set of phenomena: an alleomorphic pair of factors ( $F$  and  $f$ ) the dominance and recessiveness of which produce no effect on the zygote except when the particular mutational change from  $\alpha$  to  $\alpha^1$  has taken place; a mutation ( $\alpha$  to  $\alpha^1$ ) occurring repeatedly, but concealed, as long as self-pollination continues, by the Mendelian factors  $FF$ , and Mendelian segregation concealed by matroclonic inheritance dependent on heterogametism ( $\alpha$  and  $\beta$  gametes). It is hoped that the case may throw light upon the seemingly peculiar behavior of the *Oenotheras*."—Wilber Brotherton, Jr.

1041. CONKLIN, E. G. The mechanism of evolution. Sci. Monthly 10: 496-515. 1920.—It is certain that cytoplasmic differentiations of nerve, muscle, and gland cells have no direct influence upon hereditary constitution of germ cells and very doubtful whether cytoplasmic

differentiations of germ cells themselves affect their hereditary value. While differentiations of cytoplasm of egg do control some of the most important orientations of development, there is no satisfactory evidence that these differentiations are not the result of environment, or activity of chromosomes during early stages in the formation of the egg. If it could be proved that polarity, symmetry, or localization pattern of cytoplasmic substances of the egg are carried over from generation to generation, modifications of these differentiations would be of profound influence in evolution. But if these differentiations arise anew in each egg cell, as do various differentiations of tissue cells, through interaction of nucleus, cytoplasm, and environment, then evolutionary changes in orientation may find their ultimate causes in changes in nucleus rather than in cytoplasm. In the present stage of knowledge there is not sufficient evidence to conclude that modifications of cytoplasm of germ cells are ever really inherited or are ever initial steps in evolution. Almost all experimentally produced changes in chromosomes, known to persist, occur during mitoses, while those produced during intermitoses are, with few exceptions, relatively unimportant and temporary. Furthermore, most of the persistent modifications of chromosomes thus far discovered appear during maturation stages. These modifications consist in (a) changes in chromosome number, (b) changes in chromosome constitution. Although abnormality in chromosome number is found in some mutants, it is not certain that this abnormal number is the cause of mutation and there are some good evidences that it is probably a result rather than the cause. Under changes in constitution of chromosomes are listed crossing over, duplicated genes, and deficiency. The demonstration that the amount of crossing over may be affected by temperature and other influences furnishes direct evidence that genetical constitution may be changed by environmental influences acting on the germ cells at an early stage.—Under the heading "changes in genes" the issue of "new combinations. vs. new constitution," is discussed and the author takes issue with the "dogma of immutable genes." The fact that genes are relatively complex bodies would indicate that they can not be absolutely stable and wholly uninfluenced by environment. Mutation in genes may be thought of as due to the loss or addition of certain constituent atoms or molecules or to the rearrangement of some of these. Independent recurrence of a mutation must indicate a tendency for a gene to change in a particular way, just as chemical changes tend to go in certain directions—hence "orthogenesis." Although it is certain that mutations of genes take place, and although it is highly probable that these mutations, like all chemical and physical processes, are affected by environmental conditions, it is not known what the conditions are which induce mutations or how they may be initiated or controlled.—Mutation is characterized as a response of hereditary organization to certain stimuli. Just as the nature of any response is primarily determined by the nature of the organism, while stimuli serve merely to initiate, hasten, or retard response, so the nature of a mutation is probably definitely limited by the organization of the germplasm, while extrinsic causes serve only to initiate or retard it.—Bateson's hypothesis of evolution by loss is destructively criticized.—*F. B. Sumner.*

1042. CRANE, M. B. Experiments in breeding plums with a note on peaches. *Jour. Pomol.* 2: 137-159. 4 pl., 3 fig. 1921.—Five varieties of plums were selfed and all seedlings therefrom appear self-fertile. Hairiness of bark is dominant over glabrous bark, and crenate leaf margins over serrate leaf margins. Oblate and pyriform appear to be homozygous fruit forms oval being heterozygous. Yellow-green skin color is homozygous and red and purple heterozygous. Freestone varieties yielded freestones, and clingstone varieties gave a majority of clingstone seedlings. Of 150 self-pollinated seedlings from 1 freestone variety free from spines, 1 seedling was spiny clingstone, 1 spiny freestone, and 1 clingstone spineless.—Three varieties of peaches and nectarines were tested, all self-fertile. Small and large flowers are homozygous. Eglandular leaves and leaves with reniform glands are homozygous. Eglandular leaves are more susceptible to mildew. Six seedlings from a purple leaved variety had purple leaves.—*C. H. Connors.*

1043. CZUBER, E. Zu Paul Ehrenbergs Beweis für die Anwendbarkeit der Wahrscheinlichkeitsrechnung auf Feldversuche. [Paul Ehrenberg's proof for the applicability of bio-



metrical method in field studies.] Landw. Versuchssta. 98: 223-241. 1921.—According to Czuber the formulae for the calculation of the standard deviation and probable error ( $S. D. = \sqrt{\frac{\sum D^2}{n-1}}$ , P. E. of a single determination =  $.6745 \times S. D.$ ) can only correctly be applied when, the results give a frequency polygon which closely approaches the normal curve. The frequency distributions for various sets of data obtained from field studies are given. Many of the frequency distributions are distinctly asymmetrical and the calculated mean does not always coincide with the largest frequency class. For these reasons Czuber disagrees with the conclusion reached by Ehrenberg, that probable errors, obtained by the method outlined, can be legitimately applied to the data obtained from field experiments.—*H. K. Hayes.*

1044. DETLEFSEN, J. A. [Rev. of: WALTER, H. E. *Genetics, an introduction to the study of heredity.* Rev. ed., xvi + 354 p., 92 fig. Macmillan & Co.: New York, 1922.] *Science* 56: 145-146. 1922.—Great progress in genetics since previous issuance of this text has necessitated many changes. One of the new chapters on Architecture of the Germ Plasm gives most important advances made recently in genetics. The reviewer warns that conclusions as to distance between genes have outstripped evidence. A chapter on determination of sex introduces much new material. In this new edition the chapter on Pure Lines and Selection and the presentation of cytological facts follow Mendelism. Some criticism on mathematical aspects is made. New diagrams and the readable style of the book are praised by the reviewer.—*J. P. Kelly.*

1045. DUJARDIN, F. Pollination of tree fruits. *Rev. Hort.* 93: 300-302. 1921.—All varieties tested of sweet and sour cherries, except a few sweet, are self-sterile.—No cases of cross-sterility were found among apples. Some cases of cross-sterility were found among plums. Cross-sterility in cherries is questioned.—Varieties of *Prunus institia* probably are the best pollinators for varieties of *Prunus domestica*. *P. spinosa* failed.—*C. H. Connors.*

1046. EDLER. Pflanzenzüchtung und Sortenwahl. [Plant breeding and the selection of varieties.] Arbeit. Deutsch. Landw. Ges. 314. 25-42. 1921.—A brief general review is presented of work done in Germany on selection of field crops, and the machinery set up by the Deutsche Landwirtschaftliche Gesellschaft for testing out of varieties.—*A. J. Pieters.*

1047. GAUGER, MARTIN. Die Mendelschen Zahlenreihen bei Monohybriden im Lichte der Dispersionstheorie. [The Mendelian ratios in monohybrids in the light of the dispersion theory.] 54 p. Diss. Göttingen. 1919.—Published also in Zeitschr. Indukt. Abstamm. u. Vererb. 22: 145-198. 1920 [see Bot. Absts. 6, Entry 1675].

1048. GRIFFEE, FRED. First generation corn varietal crosses. *Jour. Amer. Soc. Agron.* 14: 18-27. 1922.—Previous investigations are summarized to show that, out of a total of 146 corn varietal crosses, 113 exceeded the parental average in yield of grain and 84 excelled the better yielding parent. Increase for all crosses was 11.7 per cent over average of parents. New results at Minnesota show that crossing gives greater increases when the parental varieties are closely selected for ear type than when selected on the basis of yield alone. A combination of flint maize (Squaw Flint) and dent (Minnesota No. 13) was found to be desirable in yield and early maturity.—*D. F. Jones.*

1049. HAGEDOORN, C., EN A. L. [HAGEDOORN]. Cucurbita-Strijdvragen. [Disputed questions in Cucurbita.] *Genetica* 4: 64-69. 1922.—The authors believe that they have succeeded in producing parthenogenetic seed in hybrid plants of *Cucurbita* because (1) closed buds on non-hybrid plants produced no seed; (2) closed buds on hybrid plants produced either fruits full of good seed or no seed at all, but never a few good seed only; (3) the segregation in progenies raised from such seed in hybrid plants are always what might be expected to result from the cross which was made. [See also Bot. Absts. 12, Entry 1055].—*E. W. Sinnott.*

1050. HYDE, ROSCOE R. An eyeless mutant in *Drosophila hydei*. *Genetics* 7: 319-334. 1922.—A recessive eyeless mutant gave discordant results from crosses and inbred cultures until it was learned that warm and dry conditions of the culture were necessary for its full expression. Warm moist cultures produced few eyeless, while cool dry cultures produced some mutants. Pure cultures of eyeless appeared when cultures were kept warm and dry. The influence of temperature and moisture is exerted after the eggs are laid. Back-crosses of hybrids to a double recessive eyeless-scarlet race showed linkage between these 2 mutant genes and no crossing over in the male.—*J. L. Collins*.

1051. JORDAN, DAVID STARR. The California poppy. *Science* 56: 168-169. 1922.—The author calls attention to a marked variation of *Eschscholtzia californica* and its suitability for genetical work.—*J. P. Kelly*.

1052. KOTTUR, G. L., and R. K. KULKARNI. Cross-fertilization in Jowar (*Andropogon sorghum*). *Agric. Jour. India* 17: 413-416. *Pl.* 25. 1922.—The article records briefly the results of the authors' observations on the frequency of natural cross-fertilization in a field of sorghum surrounded by several rows of another variety. The variety in the field was a compact-panicled form in which the percentage of cross-fertilization is usually low as compared with that in the loose-panicled varieties. From 32 selected heads 7,616 plants were grown and of these 303, or approximately 4 per cent, were found to be hybrids. It could not be definitely said that all the intermediate forms classed as hybrids arose from cross-pollination in that season because the variety in the field was not a pure line. Only 2 out of the 32 heads selected were entirely free from cross-pollinated grains.—*H. N. Vinall*.

1053. KREMERS, R. E. The volatile oil of *Mentha aquatica* Linne, and a note on the occurrence of pulegone. *Jour. Biol. Chem.* 52: 439-443. 1922.—*Mentha aquatica* is now regarded as one of the parents of peppermint (*Mentha piperita*), and the elaboration of its oil can be thought of as following the same course as that of the other parent (spearmint, *Mentha spicata*) but stopping with the esterification of linalool.—*G. B. Rigg*.

1054. KRISTOFFERSON, KARL B. Studies on Mendelian factors in *Aquilegia vulgaris*. *Hereditas* 3: 178-190. 1922.—One plant of *Aquilegia vulgaris* bearing self-colored, dark blue flowers yielded a family of 40 offspring of which 22 were dark blue, 9 reddish violet, 7 light blue and 2 white. This ratio and results from subsequent generation led to the following digenic hypothesis: factor *B* conditions light-blueness; factor *R*, reddish color; *B* and *R*, present together, give deep blue; both absent leads to white. Other experiments revealed a simple recessive factor causing white margins of colored corollas. The factor *R* is thought to be "pleiotropic," i.e., to have effects on a plant other than that of producing reddish flower color; but the author admits the possibility of linkage explaining this situation.—*J. P. Kelly*.

1055. LORSY, J. P. Cucurbita-Strijdvragen. [Disputed questions in Cucurbita.] *Genetica* 4: 70. 1922.—In this answer to Hagedoorn [see Bot. Absts. 12 Entry 1049] the author refuses to accept the existence of parthenogenesis in *Cucurbita* until it has been shown that the plants in question are haploid in chromosome number.—*E. W. Sinnott*.

1056. LORSY, J. P. Eenige resultaten van het Oenothera-jaar 1920. [Some results of the Oenothera year 1920.] *Genetica* 2: 481-528. 57 fig. 1920.—I. The common origin of the *linearis* forms. The author states that *O. linearis* appeared in cultures from (1) a selfed *O. biennivelutina*; (2) a cross between *O. murivelutina* and *O. biennivelutina*; and (3) a selfed *O. fallax*, which was obtained from the reciprocal cross (*O. biennis* × *O. Lamarckiana*) of the one from which the aforementioned *O. biennivelutina* forms (*O. Lamarckiana* × *O. biennis*) came. The plants of *O. Lamarckiana* used in these crosses were from the same parent, and those of *O. biennis* were collected on the same spot. From a cross between another *O. biennis* plant collected at the same place and *O. muricata* the author obtained a *linearis* form, which he called *O.*



*linearis stellaris* (regular star-shaped rosette). He believes the following to be the only possible conclusion: "*O. biennis* from the railroad at Almen had hidden within all factors which were necessary to influence the formation of *linearis* forms." This does not mean according to the author that these *linearis* forms are identical, but that they have in common, one or more factors which cause the narrow leaves.—II. The common origin of the *epilobioides* forms. A case similar to that in I was observed in *O. epilobioides*, a form which appeared 3 times: (1) in 1918 in a cross between *O. murivelutina* and *O. muricata*; (2) in 1919 in a cross between *O. murilaeta gigas* and *O. murivelutina*; (3) in 1920 in a culture of a selfed variegated branch of a sectorial-variegated *O. biennivelutina*. These 3 forms are not alike in every respect, only in general habit and growth. The author believes that the *epilobioides* character is due to *O. murivelutina*, which appears in the ancestry of all 3 forms.—III. The common origin of the variegated forms. These forms were: (1) *O. biennilaeta*, sectorial variegated; (2) *O. biennivelutina*, sectorial variegated; (3) *O. biennilaeta*, aureo-variegated, and several variegated forms in other cultures. In every case *O. biennis* gathered at Almen was among the ancestors of the variegated forms. The author says "that neither the *linearis* forms, nor the variegated forms were mutants from the cultures in which they appeared," but that the factors influencing their specific character were already present in the *O. biennis* group from Almen.—IV. The common origin of the new *sulfurea* form. These forms were *O. biennivelutina sulfurea* and *O. fallax sulfurea*, and, as the author shows, due to an *O. biennis* ancestral influence similar to that in the forms mentioned in I and III. This association of factors influencing variegation and factors influencing yellow-flower color brings the author to suppose the possibility of the existence of Mendelizing factors, among which "white" and "sulphurea" should be extreme recessive factors for "green" and "yellow."—V. Different grades of green. The following results were obtained: The  $F_1$  of the cross *O. Lamarckiana*  $\times$  *O. muricata* consisted of 60 *O. gracilis*, 64 *O. gracilis diluta*, and 72 white individuals; among a similar  $F_1$  were 80 *O. gracilis diluta* and 85 white individuals. Among the  $F_1$  of the cross *O. murivelutina*  $\times$  *O. biennilaeta* were some intermediate large-flowered forms, *O. mulamarckiana*, and this crossed with *O. muricata* gave rise to 71 *O. gracilis*, 95 *O. gracilis diluta*, 57 *O. coerulea*, and 36 *O. coerulea diluta* individuals, among all of which great differences in chlorophyll content were noticed. This condition resulted in the loss of new forms lacking chlorophyll, e.g., *O. rubrosepala* (new form from a selfed *O. biennivelutina* culture) kept alive during the winter in a greenhouse.—VI. Intermediate forms. The author discusses *O. submulamarckiana*, a cross between *O. mulamarckiana* and *O. murivelutina*. Other intermediate forms are: (1) a *laeta-fallax* form from a selfed *O. fallax*, a cross between *O. Lamarckiana* and *O. fallax*; *O. fallax sulfurea*, from a selfed *O. subfalloides*; and *O. biennilaeta cauli-punctata*, like *O. biennilaeta* but with the red stem dots of *O. biennivelutina*.—VII. Multiformity of descendancy was observed in several cases. A. *O. lacrifolia* (from cross *O. fallax*  $\times$  *O. Lamarckiana*) gave, when selfed, 3 *O. nanella*, 1 *O. falloides*, 31 *O. Lamarckiana*, 3 *O. laevifolia*, and 1 questionable *O. Lamarckiana*. B. Division according to flower size among *O. murivelutina* and *O. murilaeta*. In 1918, the author noticed 3 flower sizes, large, medium, and small. He selected plants, and progenies came true to form. Among the individuals of a selfed *O. murilaeta* with round buds were 9 round buds (petals broader than long) to 3 pointed buds (petals longer than broad), showing pointed buds to be recessive. C. Formation of *O. Heriberti*, formerly *O. murilaeta-coerulea*. The author claims that "*O. muricata* forms others besides 'rigens' and 'curvans' egg cells, the chromosome complex of which consists of a mixture of 'rigens' and one or more 'curvans' chromosomes. The combination of such a mixed *muricata* egg cell with a 'gaudens' gamete forms *O. Heriberti*, which by selfing in our culture gave 28 *murilaetas* (16 round buds and 11 pointed buds, 1 died) and reproduced itself only once." Other examples of multiplicity of hybrids reported by the author are: (1) The  $F_1$  of *O. biennilaeta gigas*  $\times$  *O. biennivelutina* gave 8 different types of plants, namely, *O. Lamarckiana proxime*, one which did not come into flower, *O. bullata*, *O. albive*, *O. chloriva*, *O. flavosepala*, *O. semilata*, and *O. violaceo-sepala*. (2) The  $F_1$  of *O. murilaeta gigas*  $\times$  *O. murivelutina* gave 3 types of plants, namely, *O. plicata*, *O. parvifolia*, and *O. laciniata*. The theoretical discussion of all these data will be given in a following paper.—Peter J. Klaphaak.

1057. LOTSZY, J. P. *Oenothera-proeven in 1919.* [*Oenothera experiments in 1919.*] *Genetica* 2: 385-399. 1 pl., 3 fig. 1920.—To investigate the question whether it is possible to find among *Oenotheras* any influence of the protoplasm on the morphological characteristics of the different forms, the author used *O. Lamarckiana* forms obtained by crossing. One group of cultures came from a self-pollinated individual of an *O. Lamarckiana* culture, originated by crossing *O. biennilaeta* (from a cross of *O. biennis*  $\times$  *O. Lamarckiana*) with *O. murivelutina* (from a cross of *O. muricata*  $\times$  *O. Lamarckiana*). This group of cultures had, according to the author, a "gaudens-velans" combination in "albicansplasma." The latter was derived from the maternal ancestor *O. biennis*. Another group of cultures came from a self-pollinated individual of an *O. Lamarckiana* culture obtained by crossing *O. murilaeta* (from a cross of *O. muricata*  $\times$  *O. Lamarckiana*) with *O. fallax* (from a cross of *O. Lamarckiana*  $\times$  *O. biennis*). The *O. murilaeta* used in this cross came from the same culture as *O. murivelutina* in the former cross. The *O. Lamarckiana* obtained had, then, a "gaudens-velans" combination in "rigensplasma," this being derived from the maternal ancestor *O. muricata*.—While the flowers of the 1st group are large, those of the 2nd are small. Both were typical *Lamarckianas*, which could not be differentiated until in flower. Cultures from self-pollinated individuals of the above-named groups were exactly like their parent.—A comparison of other groups of *O. Lamarckiana* with either "albicans" or "rigens" plasma showed that *Lamarckianas* with "rigens" plasma are small-flowered and never have large flowers, while those with "albicans" plasma are large-flowered. Among the latter are, however, a few heterogeneous forms which have some small-flowered plants, for instance No. 142 *O. Lamarckiana* coming from *O. biennilaeta* (*pseudo-gigas*  $\times$  *biennivelutina*). It has 25 small-flowered to 17 large-flowered plants. The author concludes for the present that "the rigensplasma depresses the flower size of the velans-gaudens combination." He does not claim that this change in flower size is hereditary and plans to discuss, as soon as the results for 1920 are tabulated, whether or not a change in the velans-gaudens complex may possibly have taken place and, if so, its importance on his provisional conclusion in regard to the influence of protoplasm.—*Peter J. Klaphaak.*

1058. MAINWARING, C. *Improvement of Rhodesian white maize by selection.* *Rhodesia Agric. Jour.* 19: 291-294. 1 fig. 1922.—Only white maize is grown in Rhodesia as it is neither profitable nor desirable to export mixed grades; but, though practically the only 2 acknowledged varieties grown are Hickory King and Salisbury White, the plants are far from uniform in vigor, etc. In order to produce uniformity, careful selection is necessary. The methods of selection are ear-to-row test, mass selection, and field selection. In the selection of ears for seed careful attention should be given to the following points: trueness to type, uniformity of appearance, size, shape of the ears and character of the indentation of the grain; the ears should be heavy when dry. A description is given of Salisbury White maize and Hickory King.—*L. J. Goldblatt.*

1059. MENDIOLA, N. B. *A study of the inheritance of beardedness in rice in natural hybrids.* *Philippine Agric. Rev.* 15: 28-43. 1 pl. 1922.—A study of 3 generations shows that beardedness in the 2 varieties studied is partly dominant over beardlessness. Line selection only can be recommended as the best method of purification.—*E. D. Merrill.*

1060. MEUNISSIER, A. *Observations sur l'hérédité du caractère "pois à trois cosses" et du caractère "pois chenille."* [Observations on the inheritance of the character "3-podded peas" and the character "chenille."] *Genetica* 4: 279-320. 1922.—Peas having 3 flowers per peduncle were crossed with a variety having the normal number (2). The 3-podded character is a recessive of great variability. The adherence of the peas to each other in the pod is called "chenille" (caterpillar), a highly variable, recessive character which is always associated with emerald foliage. In general, pink-flowered plants are less strongly "chenille" than white- or purple-flowered plants. From the results obtained it is impossible clearly to distinguish the modifying effects of environment from the effects produced by the action of genetic factors.—*Hugh C. McPhee.*



1061. PAINTER, THEOPHILUS S. The sex chromosomes of the monkey. *Science* 56: 286-287. 1922.—Cytological studies show that there are 27 pairs of chromosomes in the "ring-tail" monkey. The sex complex consists of relatively large X- and minute Y-chromosomes. X- and Y-chromosomes separate in the 1st maturation division and divide equationally in the 2nd. Figures are presented of the sex-chromosome complex in dividing spermatogonia, behavior of X- and Y-chromosomes in 1st spermatocyte division, and XY complexes in opossum, monkey, and man.—*R. E. Clausen*.
1062. PRIDHAM, J. T. "Flour strength" and "protein content." *Agric. Gaz. New South Wales* 33: 630. 1922.—High protein content is not necessarily associated with excellency of gluten in flour. If a movement toward entire wheat bread should assume importance, strength of flour, as well as yield of grain, must receive serious consideration by the plant breeder. *L. R. Waldron*.
1063. SCHAFFNER, J. H. The sexual nature of vegetative or dichotomous twins of *Arisaema*. *Ohio Jour. Sci.* 22: 149-154. 1922.—Dichotomous twins of *Arisaema triphyllum* (L.) Torr. and *A. Dracontium* (L.) Schott. showed fluctuations in some cases but were remarkably alike in varietal characters and were always of the same sex. Though no experiment whereby twins were induced to develop different sexual states was made, the fact that the sexual state of *Arisaema* has been changed by proper treatment is considered evidence that identity of sex in duplicate twins cannot be regarded as conclusive proof that sex is determined by Mendelian factors.—*H. D. Hooker, Jr.*
1064. SOUTHWORTH, W. Alfalfa hybridization. *Sci. Agric.* 2: 257-264. 1922.—The various parts of the alfalfa flower are described and illustrated. A careful study of the tripping of the flowers indicates that the spring-like-force which causes tripping is exerted by the staminal column rather than the pistil. Two ways of emasculating the flowers and various means of protecting the flowers after the pollen has been applied to the stigma are described. A greater percentage of fertile crosses were obtained during moderately warm dry weather. Treatment for a short time with sulphuric acid hastened germination when the hybrid seed contained considerable hard seed.—*H. L. Westover*.
1065. SUMNER, F. B. Linkage in *Peromyscus*. *Amer. Nat.* 56: 412-417. 1922.—The linkage relations between the genes for red-eyed yellow, pink-eyed yellow, and albinism in rats and pink eye and albinism in the mouse are stated, together with some data on linkage between the genes in *Peromyscus* for albinism and a pale red-eyed mutant, "pallid." Tests were made with F<sub>2</sub> extracted albinos and pallids mated with albino and pallid mice of known genotype. Among 135 young from 18 mice only 2 albinos and no pallids appeared, in the absence of linkage 37 albinos and 18 pallids should have been expected. The gene for pallid in *Peromyscus* and the gene for red-eyed yellow in Castle's rats are considered homologous. Albinos mated to a race of yellows gave no evidence of linkage.—*J. L. Collins*.
1066. VENKATRAMAN, T. S. Germination and preservation of sugar-cane pollen. *Agric. Jour. India* 17: 127-132. 1 pl. 1922.—The author points out that the iodine test for pollen viability simply reveals grains that were once viable. Germination tests are needed to determine viability at the time of pollination. The author was successful in using live stigmas of *Datura fastuosa* for germinating cane pollen. In sugar-cane, pollen begins to lose its viability in 20 minutes in the open air. Pollination must be effected promptly after pollen collection. A method is described by which pollen is kept alive for 11 days.—*J. P. Kelly*.
1067. WEINSTEIN, ALEXANDER. Crossing over, non-disjunction, and mutation in *Drosophila virilis*. *Sigma Xi Quart.* 10: 45-53. 1922.—This preliminary report shows the parallelism between *D. melanogaster* and *D. virilis* for crossing over, coincidence, non-disjunction, and the appearance of the same type of gynandromorphs and mutations. The rate of secondary non-disjunction was found to be lower than in other species. The YO male is sterile as in

*D. melanogaster*, the XXY females somatically indistinguishable from XX females. Triple cross-over is more frequent in the longer *D. virilis* X chromosome than in *D. melanogaster*. Two quadruple crossovers are reported for the X chromosome. Five mutant characters are mentioned, some of which resemble mutations in *D. melanogaster*. Several mutations appearing in *D. melanogaster* are briefly described.—*J. L. Collins*.

1068. WITSCHI, EMIL. Vererbung und Zytologie des Geschlechts nach Untersuchungen an Fröschen. [Inheritance and cytology of sex according to investigations on frogs.] Zeitschr. Indukt. Abstamm.- u. Vererb. 29: 31-68. 1 pl., 8 fig. 1922.—From temperature experiments and the  $F_1$  generation of crosses made between "differentiated" races (i.e., races whose tadpole gonads differentiate directly into pure males and females) and "undifferentiated" races (i.e., races whose male tadpole gonads are believed by the author to develop as transformations of female gonads) the following conclusions are drawn. (1) That the male of the differentiated race is heterozygous, with the formula *FFMm*; (2) that both male and female of the undifferentiated race are homozygous for sex, with the formula *FFMM*; (3) that the factors *F* and *M* in the undifferentiated race are equipotent, the sex being finally determined by thermal and resulting nutritive conditions; (4) the potencies of the factors *F* and *M* are different in each of the 4 differentiated races.—The author studied spermatogenesis of *Rana temporaria* and reports a diploid number of 26 chromosomes for this species as contrasted with reports by previous authors of 24 for other European species. He was unable to distinguish any X or Y chromosomes.—*C. L. Parmenter*.

## HORTICULTURE

J. H. GOURLEY, *Editor*

(See also in this issue Entries 1022, 1029, 1037, 1042, 1116, 1175, 1355, 1362, 1366, 1420, 1451, 1461, 1475, 1477, 1489, 1497)

## FRUITS AND GENERAL HORTICULTURE

1069. ANONYMOUS. Coconut investigation. Agric. Bull. Federated Malay States 9: 175. 1922.—There appears to be no definite relationship between the diameter or circumference of coconuts and their copra content, nor between the volume of the nut and the volume of the kernel. The percentage of oil present appears to reach a maximum when the embryo weighs from 80 to 100 gm.—*I. H. Burkill*.

1070. ANONYMOUS. Export of grapes. Results of experimental shipments. Jour. Dept. Agric. Union South Africa 5: 231-233. 1922.—This article gives a report of the Trade Commissioner and lists the prices obtained in London for 27 varieties of grapes grown at the Paarl Viticultural Experimental Station last season. It was the purpose of the test to determine suitability for market. The views of the Government Viticulturist are given for each variety.—*L. Goldblatt*.

1071. ALLEN, W. J., and W. LE GAY BRERETON. Packing house appointments. Agric. Gaz. New South Wales 33: 515-523. 6 fig. 1922.—Methods are designed for apple packing under Australian conditions.—*L. R. Waldron*.

1072. ARNOLD, W. S. The curing of the lemon. Agric. Gaz. New South Wales 33: 579-584. 1922.—The conditions and methods discussed apply particularly to the Kurrajong citrus district.—*L. R. Waldron*.

1073. BARTLETT, R. G. Ripening bananas in an air-tight chamber. Agric. Gaz. New South Wales 33: 482. 1922.—A temperature of from 75 to 80°F. ripens the fruit in from 6 to 48 hours.—*L. R. Waldron*.



1074. BLACK, O. F., and J. W. KELLY. Examination of the fruit of *Samuela carnerosana* Trelease. Amer. Jour. Pharm. 94: 477-479. 1922.—The fruit has a high percentage of soluble sugars (62.2 per cent of reducing sugars, calculated as dextrose, and 3.80 per cent of non-reducing sugars, calculated as sucrose) which might make it valuable for the manufacture of alcohol. The authors state that 1 ton of dried fruits would yield theoretically 500 pounds of alcohol. The fruits, though without taste, might, because of high pectic content, be used for jams and jellies with other fruits lacking in pectic material. Tests for alkaloids were negative. Ether removed from the dried seed about 20 per cent of a yellow oil with a small amount of lecithin. Chloroform removed a wax-like product which did not seem to possess promising properties for further investigation.—Anton Hogstad, Jr.

1075. CRAWFORD, D. C., and N. A. SHAW. Fertilizers for fruit trees in the Western Province. Jour. Dept. Agric. Union. South Africa 4: 514-520. 1922.—The 3 elements of plant food that promote healthy growth are nitrogen, phosphoric acid, and potash; lime and gypsum exert a beneficial effect on the physical and biological condition of the soil. The source and method of application of these fertilizers are described, and amounts are recommended for securing a paying crop.—L. Goldblatt.

1076. DAVIS, R. A. Export of citrus fruits. Union South Africa Dept. Agric. Bull. 1922<sup>3</sup>: 19 p., 8 fig. 1922.—This is a revised edition of the Bulletin, Local Series No. 55 of 1918. The proper method of picking and packing fruit for export is described, the types of fruit most suitable for this purpose discussed, and extracts are given from the fruit export act.—E. M. Doidge.

1077. HELMER, R. H. The practical use of fertilizers. Ann. Rept. British Columbia Fruit Growers Assoc. 32: 37-38. 1921.—Nitrogen is the chief element lacking in semi-arid orchard soils and, in most cases, can probably be best supplied by the growing of leguminous cover crops.—J. W. Eastham.

1078. HUNTER, W. T. Building up our orchard soils. Agric. Jour. [British Columbia] 7: 58-59. 2 fig. 1922.

1079. MILSUM, J. N. The African oil-palm in Sumatra. Agric. Bull. Federated Malay States 9: 90-104. 1921.—An account is given of the cultivation of *Elaeis guineensis*, its aided pollination, yield, and pests.—I. H. Burkill.

1080. PHILLIPS, E. P. A potential weed *Araujia sericifera* Brot. Jour. Dept. Agric. Union South Africa 5: 151-152. 1922.—An account is given of this creeper which is spread all over the Union and is a nuisance in some gardens.—L. Goldblatt.

1081. POLE EVANS, I. B. Report on cold storage conditions for export fruit at Capetown. Union South Africa Dept. Agric. Bull. 1920<sup>2</sup>: 9 p., 6 fig. 1920. The decay of fruit cannot be attributed to unsatisfactory conditions in the railway trucks or the Government cold stores at the docks. The cool chambers on the ship and those belonging to the Imperial Cold Storage Company were not in a satisfactory state with regard to contamination with mould spores.—E. M. Doidge.

1082. TERRY, H. P. Pruning of deciduous trees. Union South Africa Dept. 1921<sup>5</sup>: 34 p., 27 fig. 1921.

1083. THOMSON, MARY R. H., V. A. PUTTERILL, and GEORGE HOBSON. Investigations on export citrus fruit from South Africa during 1921. Union South Africa Dept. Agric. Bull. 1922<sup>1</sup>: 69 p., 43 fig. 1922.—Care in handling is again emphasized. On the boat the fruit should be kept at a temperature of 43-50°F.; however, air circulation and ventilation are as important as temperature. The quality of wrappers used on South African fruit is poor; this is one of

the causes of the unattractive appearance of certain packs. Waxed wrappers have been used experimentally with marked success. Oranges from certain districts, *e.g.*, Clanwilliam, do not appear to have good export qualities.—*E. M. Doidge*.

1084. TURNER, A. G. Citrus fruit growing in Rhodesia. Rhodesia Agric. Jour. 19: 159-168. Pl. 1-2, fig. 1-3. 1922.—The citrus industry in Rhodesia is reviewed, and the following items are discussed: selection of site, varieties to plant, and planting operations. The most suitable varieties for export trade are: (1) Washington Navel, (2) Valencia Late, (3) Jaffa, (4) Joppa, (5) Mediterranean Sweet, and (6) Paper Rind St. Michael. The first 2 are prime favorites at present. The 2 methods of planting are the square system and the hexagonal system.—*L. J. Goldblatt*.

1085. TURNER, A. G. Citrus fruit growing in Rhodesia. Rhodesia Agric. Jour. 19: 301-312. Pl. 1-5, fig. 1-7. 1922.—The following phases of citrus culture are dealt with: irrigation, fertilization, pruning, and spraying. No citrus orchard should be laid out in Rhodesia without the presence of facilities for irrigation. The 2 best methods of irrigating are by furrows and by a modified form of checks.—*L. J. Goldblatt*.

1086. WARCOLLIER, ET LE MOAL. Disparition progressive de l'acide sulfureux libre dans un jus de pomme conservé. [The progressive disappearance of free sulphuric acid from the juice of preserved apples.] Compt. Rend. Acad. Sci. Paris 174: 634-637. 1922.

1087. WESTER, P. J. A list of the tropical fruits at the Lamo Experiment Station. Philippine Agric. Rev. 13: 358-362. 1921.—This is a list of nearly 200 species, arranged alphabetically under the Latin names with accepted local names. No data of any kind are given regarding any of the species.—*E. D. Merrill*.

1088. WESTER, P. J. Notes on grafting tropical fruits. Philippine Agric. Rev. 13: 363-365. Pl. 20-25. 1921.—Random notes are given regarding the success or failure of grafting experiments in a few species of *Gnetum*, *Terminalia*, *Genipa*, *Pangium*, *Spondias*, *Eugenia*, and *Garcinia*.—*E. D. Merrill*.

1089. WESTER, P. J. Seedless breadfruits in the Caroline Islands. Philippine Agric. Rev. 14: 201-204. 1921.—This is merely a list of the native names with some very brief data regarding the types of fruits taken from Christian's book published in 1899 entitled The Caroline Islands.—*E. D. Merrill*.

1090. WESTER, P. J. The avocado and its propagation. Philippine Agric. Rev. 14: 185-194. Pl. 9-11. 1921.—Methods of propagating this popular fruit are discussed in a general way.—*E. D. Merrill*.

1091. WESTER, P. J. The food plants of the Philippines. Philippine Agric. Rev. 14: 211-384. Pl. 2-35, map. 1921.—A popular description is given of native and introduced species wild and cultivated, that are of value or potential value as food plants. The species are arranged alphabetically under their local names, with the addition of corresponding scientific names.—*E. D. Merrill*.

## FLORICULTURE AND ORNAMENTAL HORTICULTURE

1092. ANONYMOUS. Native plants at the National Botanic Gardens. No. 13. *Listrostachys arcuata*. No. 14. Silver trees. South African Gard. 12: 249. 1 fig. 1922.—A brief description is given of each of the plants mentioned.—*E. M. Doidge*.

1093. BENEDICT, R. C. The Boston fern show. Amer. Fern. Jour. 11: 97-105. 1921. [1922].—The author describes the fern show held in Horticultural Hall, Boston, Sept., 1921. A list of the 248 forms shown is given; out of the 150 fern genera known, 54 were represented.—*F. C. Anderson*.



1094. DAY, W. B. The botany of aloes. Jour. Amer. Pharm. Assoc. 11: 620-621. 1922.—The cultivation, production, and synonymy of the various species of aloes is briefly discussed.—*Anton Hogstad, Jr.*

1095. MATHEWS, J. W. The cultivation of Geraniaceae. Jour. Bot. Soc. South Africa 8: 8-9. 1922.—Their requirements under cultivation vary as largely as their form. The native species are readily raised from seed. The perennial *Monsonia* and shrubby *Pelargoniums* may be increased from root-cuttings.—*E. P. Phillips.*

1096. MATHEWS, J. W. The cultivation of heaths. Jour. Bot. Soc. South Africa 8: 21. 1922.—Given good seeds, heaths are readily raised and quickly reach the flowering stage, most sorts doing so in their 3rd year. A compost made up of equal parts of sand, leaf-mould, peat, and loam suits the hillside species, and one of equal parts of sand, leaf-mould, and peat will suit the moisture-loving ones.—*E. P. Phillips.*

1097. MESSEL, L. A garden flora. Trees and flowers grown in the gardens at Nymans. County Life: London, 1918.

1098. PALMER, R. M. Gladiolus culture. Agric. Jour. [British Columbia] 7: 181-182. 1922.—The article deals in a popular manner with the growing of this plant on southern Vancouver Island.—*J. W. Eastham.*

#### VEGETABLE CULTURE

1099. ANONYMOUS. Trinidad dasheen. (*Colocasia exulenta*) [esculenta]. Agric. Gaz. New South Wales 33: 548. 1922.—Trials of this plant at Wollongbar and Grafton have proved failures.—*L. R. Waldron.*

1100. BECKEL. Anbauversuche mit Spätwirsingkohl. [Cultural experiments with late Savoy cabbage.] Mitteil. Deutsch. Landw. Ges. 37: 509-512. 1922.—A report is made on tests carried out in 1917, 1918, 1919, 1920, and 1921 at 9 stations and with 4 varieties.—*A. J. Pieters.*

1101. KERLE, W. D. Sweet potatoes. Experiments with varieties from the United States. Agric. Gaz. New South Wales 33: 495-496. 1922.—The imported varieties did well under adverse conditions, and their superior flavor and cooking qualities make them a valuable addition.—*L. R. Waldron.*

1102. KUHN, K. Von jüngsten Stand der Germüse—und Beerenobstgärtnerei in Petersburg und Umgegend. [Condition of vegetable and berry raising in Petrograd and vicinity.] Gartenwelt 26: 351. 1922.—In Russia nurseries are in bad condition and can be built up only by foreign help. Vegetable growing has revived somewhat, but production is far less than before the revolution. The growing period is but 3 months, though the days are long. Only the early varieties of vegetables are grown, the following being standard. (1) Cabbage; Glückstädter, Rubm von Enkhuizen, Braunschweiger, and a very early one originally from southern Russia, Nummer I; (2) turnips; Krasnoselskoje is the best; (3) cucumbers; Mürumsche, Wjasnikowsche, and Borowsche.—Seed selection is very faulty as private trading is forbidden, and agents knowing nothing of vegetable seeds buy large quantities abroad.—Fruit trees do not thrive with the exception of the following varieties of apples, which do not always ripen; Antonowka, Weisser Klarapfel, and Lehm. No pears, plums, or cherries can be grown on account of the winter, but the following berries are produced; strawberries, Lexton Noble and Deutsche Evern; gooseberries, Avenarius; raspberries, Usanka. Berry growing was once profitable, but many large berry plantations are now either in bad condition or entirely ruined.—*J. C. Th. Uphof.*

1103. MARTIN-CLAUDE. Les champignons séchés sur le marché de Paris. [Dried mushrooms in the Paris market.] Bull. Trimest. Soc. Mycol. France 37: 148-149. 1921.—Drying is done in ovens heated by radiators. Tests showed that when placed in water specimens absorb water to the extent of 2.43 per cent of their dry weight. The flavor is not injured by drying. It is suggested that the handling necessitated by picking and drying may serve as a safeguard against the introduction of poisonous species into the market.—D. S. Welch.

1104. REICHELT. Ergebnis eines dreijährigen Anbauversuches mit vier Zwiebelsorten. [Report of a three-year culture test with four varieties of onions.] Mitteil. Deutsch. Landw. Ges. 37: 524-531. 1922.—Tests made at 7 stations in 1919, 1920, and 1921 are reported.—A. J. Pieters.

1105. WALTERS, J. A. T. The sweet potato. Rhodesian Agric. Jour. 19: 411-419. 2 pl. 1922.—The culture of the sweet potato (*Ipomaea Batatas*) is described. It is the most successfully grown stock feed in Rhodesia. Besides the edible root, it provides heavy yields of palatable and succulent fodder. Planting, which should be done before mid-December, may be on the flat or on the ridge, the latter rendering the harvesting easier though not providing as heavy yields as the former.—L. J. Goldblatt.

## MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 1003, 1005, 1036, 1064, 1209, 1277, 1282, 1286, 1298, 1318, 1396, 1409, 1441, 1448, 1475, 1491)

1106. ARBER, AGNES. On the nature of the blade in certain monocotyledonous leaves. Ann. Botany 36: 329-353. 29 fig. 1922.—As a further test of the phyllode theory of the monocotyledonous leaf, the development of the leaf in many members of that class was studied and compared with that of dicotyledonous plants. It was found in some cases that the course of development was indistinguishable from that found in dicotyledons, thus furnishing no support for the theory. On the other hand, in some whole families (e.g., Palmae) and in individual genera within many different families, the blade is produced by an invagination of the petiole or sheath, a process which appears to play no part in the development of dicotyledonous leaves. Cases of invagination are so numerous and so scattered as to confirm the author's view that the blades of monocotyledons are pseudo-laminae. A classification of the leaves of the whole group is outlined, based upon the course of development and chiefly upon the numerous forms which the invagination assumes.—W. P. Thompson.

1107. BAAS-BECKING, L. G. M. The origin of the vascular structure in the genus *Botrychium*, with notes on the general anatomy. Recueil Trav. Bot. Néerland. 18: 333-372. 2 pl., fig. 1-48. 1921.—*Botrychium obliquum*, *B. simplex*, *B. neglectum*, *B. virginianum*, *B. silicifolium*, and *B. lanuginosum* were studied. Cauline strands, such as occur in the Marattiaceae, are absent in the stems of *Botrychium*. In *B. obliquum* the suspensor has no influence on the position of the cotyledon. The development of the vascular bundle starts at a very early stage. The protoxylem is typically irregular and the protophloem conspicuous by its shrunken cells. The junction of root and leaf traces shows that the primary xylem of the leaf becomes the innermost part of the xylem, the protophloem of the root being situated at the periphery. The pericycle is in many species of *Botrychium* the place where the secondary xylem is formed, and it is assumed that this cambial activity is an initial stage in the secondary growth of the stele. The vascular system of the root is the same as is shown by Campbell for *B. virginianum*. In *B. silicifolium* the leaf trace has a typically Osmundaceous character. The development of *B. simplex* shows a close affinity to that of *B. lunaria* and *B. neglectum*. The relationship of *Botrychium* to *Ophioglossum* and *Helminthostachys* is apparent. In the roots and prothallia, the endophytic fungus is abundant in all species, but is



absent in the leaves except in *B. silacifolium*. The mycelium stains deeply with safranin and in older stages with Bismarck brown also. The fungus closely resembles *Stygeosporium Marattiacearum*.—*J. C. Th. Uphof*.

1108. BLOMQUIST, HUGO L. Vascular anatomy of *Angiopteris evecta*. Bot. Gaz. 73: 181-199. Pl. 1-4, fig. 1-7. 1922.—Young sporophytes from Samoa were studied. Cortical and central vascular primary regions are distinguished. In addition to the crescentic vascular strand of the central region, commissural and medullary strands appear. The leaf traces are always given off from the same edge of the central strand, and at corresponding positions below, on the other edge, a root departs. The contribution to the leaf traces is balanced on the opposing edge by an increase in the vascular tissue and by addition of commissural strands. The spiral condition is due to the spiral succession of leaves. The course of all tissue strands and their fusions is described in detail. The evidence found leads the author to suggest "that the vascular tissue of the central region is a sympodium of leaf traces and most if not all of the central strand is of foliar origin."—*B. W. Wells*.

1109. BOS, H. Waterloten. [Water-sprouts.] Cultura 34: 141-151. 11 fig. 1922.—An individual of *Picea excelsa* developed a lateral twig which grew vertically and had the same appearance as the main stem. This twig did not grow from a dormant, but from an adventitious, bud. Water-sprouts are also described in *Betula alba*, *Prunus cerasus*, *Robinia pseudacacia*, and *Fagus sylvatica*.—*J. C. Th. Uphof*.

1110. BURKILL, I. H. Notes on Dipterocarps. No. 7. On the fruit and germination of *Isoptera borneensis*. Jour. Straits Branch Roy. Asiatic Soc. 86: 281-284. 1922.—The fruits of this species are distributed by water, the corky sepals forming the buoyant part. The embryo does not cease growth at the time of the fall of the fruit, but by pressure from within bursts the fruit-wall, usually along 3 lines. The position of these lines is not constant and is a response to the direction of the pressure.—*I. H. Burkill*.

1111. BURKILL, I. H. Notes on Dipterocarps. No. 8. On some large-fruited species, and in particular upon the effects of the pressure of the embryo against the interior of the fruit-wall. Jour. Straits Branch Roy. Asiatic Soc. 86: 285-291. 1922.—*Shorea Thiseltoni* King has oily fruits too large for wind distribution and which sink in water. They are distributed over small distances by rolling along the forest floor or by means of animals. The embryo does not become dormant but continues growing, bursting the fruit-wall at the places where pressure is greatest. The drying wall contracts slightly, causing one or more of these openings to gape widely. In *Vatica Ridleyana* Brandis, which has a larger and starchy fruit, and in *Dryobalanops* sp., "Koladan," which has a wingless fruit, the fruit-wall is ruptured in much the same way as in *Shorea Thiseltoni*. These are not cases of true dehiscence.—*I. H. Burkill*.

1112. BUSCALIONI, L., E G. ROCCELLA. Intorne ad alcune singolari anomalie delle radici di una plantula di *Amygdalus communis* L. [Some peculiar anomalies in roots of an *Amygdalus communis* seedling.] Malpighia 29: 294-315. Pl. 1-3, fig. 1-17. 1922.—A case of polytomy is reported in which the main root of a seedling was split into 4 rather short secondary roots of unequal length, brownish, and diseased in appearance. Cross sections demonstrated various distortions and abnormalities of structure, particularly in the vascular system, which are described in detail.—*Edith K. Cash*.

1113. CATALANO, G. Anatomia fisiologica del tessuto verde fogliare delle Graminaceae. [Physiological anatomy of the green leaf tissue of the Graminaceae.] Gior. Sci. Nat. Econ. Palermo 32: 87-119. 1921.—The author reviews in detail the work of previous writers. He suggests the following tissue classification, based primarily upon anatomical characters. Group I: Leaf tissue consisting of ordinary green cells, either elongated or isodiametric, and producing both sugar and a small amount of starch by photosynthesis. Group II: Leaf tissue consisting of cells of varying form and producing only sugar (rarely traces of starch). Group

III: Tissues of the bundle sheath forming conspicuous amounts of starch and surrounded by paler cell layers which produce no starch. The individual groups are subdivided according to the number of cell layers, the differentiation into palisade and spongy parenchyma, the relative size of the bundles, and the presence of sclerenchymatous elements and other specialized tissues. In doubtful species, the internal characters aid in assigning these species to their proper groups.—*Ernst Artschwager*.

1114. CONARD, H. S., and W. A. THOMAS. **Measurements of wood fiber.** *Proc. Iowa Acad. Sci.* 26: 333-335. 1919.—The maximum, minimum, and average lengths and widths are given for fibers from 41 species of wood from the genera *Pinus*, *Picea*, *Tsuga*, *Abies*, *Sequoia*, *Taxodium*, *Thuja*, *Juniperus*, *Juglans*, *Carya*, *Populus*, *Salix*, *Betula*, *Fagus*, *Quercus*, *Ulmus*, *Celtis*, *Liriodendron*, *Platanus*, *Prunus*, *Robinia*, *Acer*, *Tilia*, *Fraxinus*, and *Catalpa*. The cells were obtained by maceration with nitric acid and potassium chlorate.—*H. S. Conard*.

1115. COSTERUS, J. C. **La structure de la fleur de Canna.** [The structure of the flower of *Canna*.] *Recueil Trav. Bot. Néerland.* 17: 26-32. 1 pl. 1920.—A general account is given of the structure of the flower in this genus, with especial reference to the connective tissue ("accoupleur") which joins the style to the stamens, the syndrome of the flower, and the morphological significance of the style.—*J. C. Th. Uphof*.

1116. KONDO, M. **Ueber die in der Landwirtschaft Japans gebrauchten Samen.** [The seeds used in Japanese agriculture.] *Ber. Ohara Inst. Landw. Forsch.* 2: 95-131. *Fig.* 34-38. 1921.—This continuation of descriptions already published [see *Bot. Absts.* 5, Entry 37; 8, Entry 2013] deals with certain morphological characters of seeds and seedlings. The present article concerns the following species: *Spinacia spinosa*, *S. glabra*, *Beta vulgaris*, *Capsicum annum*, and *Nicotiana Tabacum*.—*H. S. Reed*.

1117. LUYTEN, IDA, EN MARTHA C. VERSLUYS. **De Periodiciteit van de Knopontwikkeling bij Rhododendron, Azalea en Syringa.** [The periodicity of bud development in *Rhododendron*, *Azalea*, and *Syringa*.] *Mededeel. Landbouwhoogeschool Wageningen* 22: 1-128. 9 pl. 1921.—In *Rhododendron Catawbiense* Boursault the differentiation of the flower primordia in the axils of the lower bracts in most of the inflorescences was found to be fairly advanced by June 23. Every bud contained an average of 16 flowers. By August 19 the anthers had grown very tall and the ovary had reached a fuller growth. By October 22 the flower was in the condition in which it would remain through the winter. The bractlets had now become downy and strongly toothed. During the formation of the flower the axes elongate and their later extension forms the umbel-shaped raceme. Temperature was found to have an important influence on the development of flower buds. In *Azalea mollis* × *chinensis* Anthony Koster, the terminal flower buds only were studied. The growing point forms but 1 circle of stamens (instead of 2 as in *Rhododendron*), then passing on to the formation of carpels. The few bud scales around the flower buds are almost all deformed foliage leaves and often have small leaf buds in their axils. The lateral buds have true scales. The flower bud in 1918-1919 showed no increase in size from October till April. In *Syringa vulgaris* the first floral differentiation generally occurs in the shape of a rectangular calyx wall around the primordium. The sepals arise rather irregularly from the calyx wall and the 4 petals and the stamens inside these become visible soon after. The 2 carpels appeared as small elevations in the earliest flowers on August 1, 1919. On August 18 the division into anther sacs was clearer, whereas the carpels were but little more developed. On September 18 differentiation into anthers and locelli was clearly visible in most flowers. The development of the inflorescence and the formation of the leaf buds are also described.—*J. C. Th. Uphof*.

1118. MANN, H. H. **Variation in the flower of *Jasminum malabaricum* Wright.** *Jour. Linn. Soc. Bot. London* 45: 155-158. 1920.—The variability of the corolla and calyx lobes of the tropical climber, *Jasminum malabaricum*, was studied in the jungle where the plants were unquestionably wild. Tables are presented showing counts on many flowers, and comparing



the flowers on different inflorescences and on plants differing in vigor. The flowers on various inflorescences vary irregularly. The differences in different plants are marked. Different numbers of lobes or teeth seem to be constant for different plants, and "this condition seems to be a function of the individuality of the plant." A study of the correlation in number of corolla lobes and calyx teeth was also made and a table prepared. This correlation appears to be very slight.—A. J. Eames.

1119. OBATON, F. Sur le nanism des feuilles des arbres. [Concerning nanism of the leaves of trees.] Rev. Gén. Bot. 34: 264-279. 1922.—Leaves of *Castanea vulgaris*, *Ligustrum japonicum*, *Ulmus campestris*, *Tilia* spp., *Fagus silvatica*, *Carpinus betulus*, *Buxus sempervirens*, *Prunus avium*, *Acer platanoides*, and *Celtis australis* were studied and measurements recorded. The author concludes that all the adult leaves of the same species have the same thickness. The anatomical elements have analogous dimensions and are equal in number in transverse section. Vessels which supply the same number of cells are of the same size. The grouping of the vessels into bundles is made in such a manner that comparable veins serve identical foliar surfaces; but if the number of elements to be vascularized becomes greater, the number of vessels increases, and the quantity of fibro-vascular bundles is enlarged. Thus the petiole of a small leaf of the beech presents a single group of fibro-vascular bundles where in a comparable region of the petiole of a large leaf 2 or more groups of bundles occur. In chestnut it was necessary to choose leaves having exactly the same surface in order to find in their petioles comparable structures. All the modifications observed led to the conclusion that the small leaf was not a reduction of a large leaf. All the facts showed that nanism of leaves consists entirely in the reduction of the number of elements and not in the diminution of their size.—J. C. Gilman.

1120. RECORD, SAMUEL J. On Formosan forests. [Rev. of: KANEHIRA, RYOZŌ. Anatomical characters and identification of Formosan woods with critical remarks from the climatic point of view. 317 p. Bureau of Productive Indust. Taiboku, Formosa, 1921 (see Bot. Absts. 11, Entry 443).] Geog. Rev. 12: 152-153. 1922.

1121. RINGEL-SUESSENGUTH, MARGARETE. Über Ruheorgane bei einigen Wasserpflanzen und Lebermoosen. [On resting organs in certain aquatic plants and liverworts.] Flora 115: 27-58. 1 fig. 1922.—Three aquatic plants (*Hydrocharis morsus ranae*, *Myriophyllum verticillatum*, and *Utricularia vulgaris*) and 3 liverworts (*Fegatella corsica*, *F. supradecomposita*, and *Pellia calycina*) were investigated with respect to their resting organs and the conditions necessary for their development. It was shown that the formation of these organs was not due to an autonomous periodicity but that it could be hastened or postponed by appropriate means. The most potent factors in hastening the process were found to be reduced light intensity, low temperature, and diminished supply of water and nutrient salts; while maintenance of the conditions prevailing during the summer months delayed the process or, in the case of *Pellia*, prevented it altogether. It was shown further that the resumption of growth in the resting organs could be accelerated by various stimuli, such as mechanical injury, continuous illumination, treatment with potassium cyanide, or higher temperature. Other recommended methods of forcing, however, such as treatment with ether or the injection of water or diastase, proved unavailing.—A. W. Evans.

1122. RUTKIEWICZ, M. B. Recherches anatomiques sur l'*Asarum europaeum* L. [Anatomical studies on *Asarum europaeum*.] Ann. Univ. Grenoble 33: 21-146. Pl. 1-3. 1921.—The arrested development of the 2nd foliage leaf and the atypic structure of the 1st node of the rhizome in this species is a predisposition toward the production of the ancestral form. *Asarum variegatum* of Japan has only a single foliage leaf, and it is therefore suggested that the European species is a derived type, the 2nd foliage leaf being a newly acquired, but not as yet firmly fixed, character.—Ernst Artschwager.

1123. STOUT, A. B. Cyclic manifestations of sterility in *Brassica pekinensis* and *B. chinensis*. Bot. Gaz. 73: 110-132. Fig. 1-7. 1922.—Strains of the above species charac-

terized by excessive leafy growth were studied. Three types of sterility were noted: (1) Impotence as indicated in flower abortion and arrested development of the last flowers; (2) Proliferation as exhibited by destruction of pistils through the development of floral "anlage" within the carpels at their bases. The pistils of the resultant flowers do not produce fruit; (3) Grades of sexual incompatibility are present. From complete self-incompatibility (about half the plants studied) all grades of self-compatibility ("feeble," "medium," "strong") were noted. With respect to single plants it was found that the period of mid-bloom (the climax of reproductive activity) showed the maximum self-compatibility, the period before and after being characterized by flowers which made no response to self-pollination. Work with pedigree cultures indicated that self-compatibility is a character which is not hereditary. The author points out that through the sexual differentiation of sporophytic structures in the evolution of the higher plants, "sexual reproduction has become more and more inter-related with the vegetative phase of the sporophyte and subject to its internal and biogenetic regulation. \* \* \* \* The expression of sex therefore is on the same basis as are somatic differentiations. The various types of sterility seen in these species of *Brassica* indicate a mutually limiting relationship between vegetative and reproductive vigor."—*B. W. Wells.*

1124. TONI, J. B. DE. Contribution to the teratology of the genus *Datura* L. Jour. Linn. Soc. Bot. London 47: 419-420. Pl. 25. 1921.—The author describes a type of monstrosity new to the genus *Datura*, in which monstrosities and anomalies are common. In *D. Stramonium* certain plants which form normal flowers and fruits in the early season later develop flowers with, large inflated, foliaceous calyx, and with corolla, stamens, and ovary vestigial or wanting. The writer purposes studying the inheritance of this condition.—*A. J. Eames.*

1125. VERDOORN, INEZ C. Note on *Aponogeton distachyon*. South African Jour. Nat. Hist. 3: 17-19. 1 pl. 1922.—At maturity the carpels split at the apex and the pericarp curls back and exposes the seed, which escape and float on the surface of the water. After floating for 8 days the testa splits and the "seed" sinks and germinates in the soil under water.—*E. P. Phillips.*

## MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

L. H. TIFFANY, *Assistant Editor*

(See also in this issue Entries 1257, 1328, 1427)

1126. CROW, W. B. A critical study of certain unicellular Cyanophyceae from the point of view of their evolution. New Phytol. 21: 81-102. Fig. 1. 1922.—The characters of various genera of the Chroococcaceae are analyzed with a view to ascertaining their importance in the evolution of the group and in helping to establish a satisfactory system of classification. It is concluded that "certain characters, such as the orientation of the planes of division, the form of the cell, the size of the cell, can be, to a large extent, relied upon as systematic distinctions," while the presence of pigments, pseudovacuoles, and certain types of stratified membranes may also be of importance. "The degree of differentiation of the protoplasm and particularly the distribution of the pigment are very significant." "On the other hand, the character of the stratum or colony has only slight morphological significance." The Chroococcaceae as a whole form a homogeneous group which is primitive rather than reduced in its simple characters.—*I. F. Lewis.*

1127. HAZEN, TRACY E. New British and American species of *Lobomonas*: a study in morphogenesis of motile algae. Bull. Torrey Bot. Club 49: 123-140. Pl. 5-6. 1922.—*Lobomonas pentagonia* from England and *L. rostrata* from New Jersey are described as new species; a discussion is given of morphology and reproduction. "A consideration of morphogenesis in primitive algae" gives a review of recent literature and of problems involved.—*P. A. Munz.*



1128. HAZEN, TRACY E. The phylogeny of the genus *Brachiomonas*. Bull. Torrey Bot. Club 49: 75-92. Pl. 3-4, fig. 46-50. 1922.—For the first time *Brachiomonas*, a genus of the *Chlamydomonas* group, is reported outside of western Europe. *B. submarina* Bohlin from Long Island Sound is discussed as to habits and morphology, and forma *obtusata* f. nov. is described. *B. simplex* sp. nov. is described from Norway and England. *Chlamydomonas caudata* Wille is discussed, as is the phylogeny of certain Chlamydomonads.—P. A. Munz.

1129. RICH, FLORENCE. A new species of *Coelastrum*. New Phytol. 20: 234-238. Fig. 1-15. 1921.—*Coelastrum schizodermaticum* sp. nov. is described from Leicestershire. The diameter of the usually 8-celled coenobium is about 35  $\mu$ , of a single cell 10-14  $\mu$ . Cap-like structures are split off from the outer walls of the cells.—I. F. Lewis.

## MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entries 1121, 1214, 1253)

1130. DOUIN, CH. Sur le gamétophyte des Marchantiées. [On the gametophyte of the Marchantiaceae.] Compt. Rend. Acad. Sci. Paris 174: 121-123. 1922.—Certain cells remain alive in otherwise dead thalli for 1, 2, or even more years. These cells are the terminal initials and the secondary initials. Various anomalies are mentioned. A description of the relation of primary and secondary initials and the merophytes in the course of the development of the thallus is given.—C. H. Farr.

1131. PEARSON, W. H. New Tasmanian hepatic (*Cheilolejeunea hobartiensis* Pearson). Rev. Bryologique 49: 11-13. 14 fig. 1922.—Under this name the author describes and figures a new hepatic from the vicinity of Hobart, Tasmania, basing it on material collected by W. A. Weymouth. He likewise discusses *Strepsilejeunea austrina* Spruce of New South Wales and refers it as a synonym to *Lejeunea mimosa* Tayl.—A. W. Evans.

1132. POTIER DE LA VARDE, R. Observations sur quelques espèces du genre *Fissidens*. [Observations on certain species of the genus *Fissidens*.] Rev. Bryologique 49: 1-5. 5 fig. 1922.—The present paper is the continuation of a series, the earlier parts of which have already been abstracted [see Bot. Absts. 5, Entry 628; 6, Entry 158; 7, Entry 1975; 8, Entry 1270; 10, Entry 1844; 12, Entry 585]. The author here reports *Fissidens Curnowii* Mitt. for the first time from Tunis, the record being based on specimens earlier listed as *F. crassipes* Wils. He also gives a full discussion of *F. crassipes* var. *Philiberti* Besch., a calcicolous plant known only from Algeria and Morocco. As a result of his studies he separates it from *F. crassipes* and describes it as a distinct species under the name *F. Philiberti* (Besch.) P. de la V.—A. W. Evans.

1133. POTTIER, M. Recherches sur le développement de la feuille des mousses. [Studies on the development of the leaf in mosses.] Ann. Sci. Nat. Bot. 3: 1-137. 32 pl. 1921.—This paper was originally issued as a separate publication and has already been abstracted [see Bot. Absts. 9, Entry 879].—A. W. Evans.

1134. THÉRIOT, I. Mousses de l'Annam, 2<sup>e</sup> contribution. [Mosses of Anam, 2nd contribution.] Rev. Bryologique 49: 6-9. 3 fig. 1922.—The author's 1st paper on the mosses of Anam appeared in 1919 [see Bot. Absts. 4, Entry 1041]. The present paper is based on a collection made in August, 1919, by F. Vincens on Mt. Honbâ, at an altitude of 1500 m. Of the 14 species enumerated, *Homaliodendron elegantulum* and *Sematophyllum Vincensianum* are described as new and the following 3 species are recorded for the 1st time from the Asiatic continent: *Ctenidium serratifolium* (Card.) Broth., *Macromitrium ceylanicum* Mitt., and *Mniodendron humile* Lindb. Critical notes accompany several of the species.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA,  
AND MYXOMYCETESH. M. FITZPATRICK, *Editor*D. S. WELCH, *Assistant Editor*

(See also in this issue Entries 1031, 1032, 1033, 1103, 1375, 1401, 1412, 1413, 1435, 1436, 1455, 1456, 1492 and those in Section Pathology)

## FUNGI

1135. ANONYMOUS. Haslemere spring foray. Trans. British Mycol. Soc. 7: 221-224. 1922.—The annual spring foray, which was held at Haslemere, Surrey, May 13-16, 1921, is reported and a complete list is given of the fungi collected, numbering about 232 species.—*W. B. McDougall.*

1136. ARTHUR, JOSEPH CHARLES. New species of Uredineae—XIV. Bull. Torrey Bot. Club 49: 189-196. 1922.—The following descriptions and nomenclatorial changes are made: *Bullaria Zorniae* (Dietel) comb. nov., *Melampsoropsis roanensis* sp. nov., *Cronartium stalactiforme* Arthur & Kern comb. nov., *Diabole* gen. nov., *D. cubensis* comb. nov., *Puccinia Plucheae* (Sydow) comb. nov., *Uredo nominata* sp. nov., *U. cumula* sp. nov., *U. curvata* sp. nov., *Aecidium Yuccae* sp. nov.—*P. A. Munz.*

1137. ARTHUR, J. C. Uredinales collected by R. Thaxter and J. B. Rorer in Trinidad. Bot. Gaz. 73: 58-69. Fig. 1-4. 1922.—The author presents a list of 41 known species and 3 new ones, *Cerotelium minutum* on undetermined Bignoniaceous host, *Puccinia corticola* on *Cordia Gerascanthus* L., and *Maravalia pallida* on *Pithecolobium latifolium* (L.) Benth. The last is the type of a new genus.—*D. S. Welch.*

1138. AZOULAY, LÉON. Détermination instantanée de la couleur des spores. [A quick method for determining spore color.] Bull. Trimest. Soc. Mycol. France 37: 146-148. 1921.—This may be accomplished by passing between the gills some object to which the spores will adhere. Black and white paper, cloth, feathers, or brushes are suggested. A greater quantity of spores may be obtained by means of a small water-color brush slightly moistened. In testing specimens with milky juice it is necessary to use both black and white paper, the true spore color being given by the spots on the paper which are pulverulent and easily removed by brushing with the finger. In mature specimens the spores may be caught by placing the cap, gills downward, on a smooth surface from which the spores may later be removed by brushing and transferred to a testing surface.—*D. S. Welch.*

1139. BAKER, C. F. Additions to Philippine and Malayan technical bibliography. Philippine Agric. 10: 363-366. 1922.—Eleven citations to mycological contributions are given which are to be added to the bibliographical list published earlier [see Bot. Absts. 5, Entry 1238]. The titles consist of published studies based wholly, or in part, on the material of Philippine and Malayan fungi brought together by C. F. Baker. The bibliography also contains many citations to similar entomological contributions.—*Sam F. Trelease.*

1140. BARBIER, M. Découverte du *Secotium acuminatum* Mtg. près de Dijon (Côte d'Or). [The discovery of *Secotium acuminatum* Montagne near Dijon (Gold Coast).] Bull. Trimest. Soc. Mycol. France 38: 29-30. 1 fig. 1922.—A note is given on the collection of this rare fungus together with a description of the same.—*D. S. Welch.*

1141. BONAR, LEE. An albino mutation of the dematiaceous fungus *Brachysporium Trifolii*. Science 56: 226-227. 1922.—The dark brown hyphae lost their color in one sector of growth in a culture. For 16 non-sexual generations this strain has persisted. No sexual stage has been obtained in either the normal or the albino strain.—*C. J. Lyon.*



1142. BONNS, WALTER W. A preliminary study of *Claviceps purpurea* in culture. Amer. Jour. Bot. 9: 339-353. 6 pl. 1922.—*Claviceps purpurea* was grown in culture on agar, vegetable plugs, and various mashes. Results agree with those of previous workers except as to conditions producing certain morphological variations. A stage showing structure analogous to that of the natural sclerotium was produced. The conidial stage may develop directly from the sclerotium without germination and without the formation of ascospores. An extract of the culture-grown fungus was tested for 3 of the chief active principles of ergot—tyramine, histamine, and ergotoxine—and the presence was demonstrated of histamine only. A much larger amount of material should be grown and studied before its chemical composition can be determined with accuracy. It seems doubtful whether the artificial culture of *Claviceps* is practical commercially.—E. W. Sinnott.

1143. BOSE, S. R. Descriptions of some polypores new to Bengal. Proc. Sci. Convention Indian Assoc. Cultivation Sci. 1919: 55-62. Pl. 1-6. 1922.—The paper constitutes Part IV of Bengal Polyporaceae, which is being published serially. The following 7 species collected in different parts of Bengal are described, and figures illustrating both the upper and lower surfaces of the fruit-body are given for each: *Lenzites alutaceus*, *Polyporus rhizophorae*, *P. rigidus*, *Polystictus xanthopus*, *P. flabelliformis*, *P. suboccidentalis*, and *Trametes Meyenii*. Of these the 4th and 5th were also collected in Madras.—S. R. Bose.

1144. BOSE, S. R. Polyporaceae of Bengal. Part V. Bull. Carmichael Medical College 3: 20-25. Pl. 1-9. 1922.—Twelve species representing the genera *Fomes*, *Polyporus*, *Polystictus*, *Trametes*, and *Daedalea*, collected in Bengal, Assam, and Madras, are described and figured.—S. R. Bose.

1145. BRÉBINAUD, P. Bolets à pores rouges et Russules rouges. [Red pored Boleti and red Russulas.] Bull. Trimest. Soc. Mycol. France 37: 149-155. 1921.—*Boletus purpureus* (Fr.) is described with synonymy. Changes in color of pileus are due to variations in moisture. This also applies to other fungi with flesh changing color on exposure to air. Among certain species of *Russula* external conditions appear to govern the amount of coloring on the pileus. The formation of reticulations and dots at the base of the stipe in Boleti is due to the rupturing of the tubes or hyphae which in the beginning are attached to the base of the stipe. Thus the coloring of the reticulations and of the pores in the younger stages is believed to be a process of oxidation of freshly exposed tissue. Two types of subterranean mycelia are distinguished, one nutritive, the other for respiration. In the ground the mycelium is found mostly in holes made by insects or in areas loosened by burrowing animals or other agencies.—D. S. Welch.

1146. BROOKS, R. ST. JOHN. The national collection of type cultures. Trans. British Mycol. Soc. 7: 237-239. 1922.—The national collection of type cultures which is located at the Lister Institute of Preventive Medicine was formed in January 1921 and since that time "some twelve hundred strains of microorganisms of medical, veterinary and economic importance have been incorporated in the collection and cultures have been distributed to workers at home and abroad at the rate of about two thousand per annum." More recently the scope of the national collection has been extended to include cultures of representative fungi.—W. B. McDougall.

1147. BULLER, A. H. R. The basidial and Oidial fruit-bodies of *Dacryomyces deliquescens*. Trans. British Mycol. Soc. 7: 226-230. 1921.—*Dacryomyces deliquescens* produces 2 kinds of fruit-bodies, one orange colored and bearing oidia, the other yellow and producing basidiospores. These 2 kinds of fruit-bodies were originally described as separate species, and in order to clear up the confusion arising from this fact the plant is here redescribed in detail.—W. B. McDougall.

1148. BURT, E. A. Some North American Tremellaceae, *Dacryomycetaceae*, and *Auriculariaceae*. Ann. Missouri Bot. Gard. 8: 361-396. Pl. 3, figs. 1-6. 1921.—Burt has compared

Vermont collections with authentic specimens of tremellaceous fungi in the Schweinitz herbarium and has studied species in this group described by Berkeley & Curtis, Peck, and others. His notes are presented on 16 species included in the Tremellaceae, 9 in the Dacryomycetaceae, and 4 in the Auriculariaceae. *Heterochaete microspora*, *Auricularia rosea*, and *Helicobasidium Peckii* are described as new species, while there are 9 new combinations, in which *Peziza concrescens* Schw. becomes *Tremella concrescens* Schw. Burt, *Eridiopsis alba* Lloyd becomes *Eridia alba* (Lloyd) Burt, *Tremella nucleata* Schw. becomes *Eridia nucleata* (Schw.) Burt, *Tremella aurantia* Schw. becomes *Naematelia aurantia* (Schw.) Burt, *Sebacina Sheari* Burt becomes *Heterochaete Sheari* Burt, *Tremella palmata* Schw. becomes *Dacryomyces palmatus* (Schw.) Burt, *Tremella subochracea* Peck becomes *Dacryomyces subochracea* (Pk.) Burt, *Tremella stipitata* Peck becomes *Dacryomitra stipitata* (Peck) Burt, and *Eridia pedunculata* Berkeley & Curtis becomes *Dacryomitra pedunculata* (B.&C.) Burt.—S. M. Zeller.

1149. BURT, E. A. The North American species of *Clavaria*, with illustrations of the type specimens. Ann. Missouri Bot. Gard. 9: 1-78. Pl 1-11. 1922.—In this contribution Burt gives helpful suggestions to collectors of coral fungi. In the various sections of North America collections should be taken with careful records as to color, odor, taste, and spore characters of fresh specimens. Colors should be standardized by comparison with some chart, as Ridgway's, and spore collections made in some standard way, as on glass, with records of the color values *en masse* when fresh. Mature specimens which shower spores freely are much preferred to the immature collections which often "clutter up herbaria and waste valuable time." Burt has brought together the original descriptions (together with his notes) of North American species, their spore characters, and photographic illustrations of the type specimens. Notes on such exotic species from South America and the North Pacific Exploring Expedition as were available for examination have been appended. Among the 98 accepted North American species *Clavaria pinicola*, *C. flavuloides*, *C. mutans*, and *C. pilosa* Burt are described as new. Sixteen species with the original descriptions are listed as "imperfectly known." Eight "excluded species" include new combinations in which *Clavaria ornatipes* Peck becomes *Lachnocladium ornatipes* (Peck) Burt, *Clavaria subcorticalis* Schw. becomes *Lachnocladium subcorticale* (Schw.) Burt, *Clavaria vestipes* Peck becomes *Lachnocladium vestipes* (Peck) Burt, *Clavaria tenax* Schw. becomes *Tremellodendron tenax* (Schw.) Burt, and *Clavaria Typhuloides* Peck becomes *Pistillaria Typhuloides* (Peck) Burt. Six exotic species are listed.—S. M. Zeller.

1150. CORTINI, JONE COMANDEUCCI. *Tylomyces gummiparus* n. sp. prototipo di un nuovo genere di Ifomiceti. Caratteri morfologici. Nota I. [Tylomyces gummiparus n. sp. prototype of a new genus of the Hyphomycetes. Morphological characters. Note I.] Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.) 30<sup>2</sup>: 63-66. Fig. 1-14. 1921.—A hyphomycetous fungus referable to the family Dematiaceae, section Phragmosporae, was found growing saprophytically on *Dianthus Caryophyllus*. The aerial mycelium is more or less covered with irregular brownish scales or plates. The conidia are borne in chains and are formed mesendogously as recently described by Peyronel for another fungus [see Bot. Absts. 12, Entry 1187]. The chains of conidia are peculiar in that the end of one conidium is commonly attached to the side of the next.—F. M. Blodgett.

1151. CORTINI, JONE COMANDEUCCI. *Tylomyces gummiparus* n. sp. prototipo di un nuovo genere di Ifomiceti. Caratteri biologici e sistematica del fungo. Nota II. [Tylomyces gummiparus n. sp. prototype of a new genus of Hyphomycetes. Biologic and systematic characters of the fungus. Note II.] Atti R. Accad. Lincei Roma Rendiconti (Cl. Sci. Fis. Mat. e Nat.) 30<sup>2</sup>: 113-116. Fig. 15-33. 1921.—The germination of the conidia of *Tylomyces gummiparus* is described in some detail. This fungus is readily grown in culture without losing its characteristic form. Systematically it resembles *Fusariella* Sacc., but the peculiar chains of spores and the scale-like covering of the mycelium leads the author to describe it as the type of a new genus.—F. M. Blodgett.



1152. COURTILLOT, J. Observations sur quelques champignons de la vallée supérieure de la Saône. [Some fungi of the upper Saone valley.] Bull. Trimest. Soc. Mycol. France 38: 31-33. 1922.—Brief notes are given with special reference to odor, taste, and habitat on certain species from the following genera: *Tricholoma*, *Clitocybe*, *Collybia*, *Hygrophorus*, *Russula*, *Pleurotus*, *Hypholoma*, *Coprinus*, *Boletus*, and *Phallus*.—D. S. Welch.

1153. CRÉPIN, CH. Un Oidium de la betterave. [An Oidium of the beet.] Bull. Soc. Path. Vég. France 9: 118-119. 1 fig. 1922.—The conidia are the same length as those of *Microsphaera Betae* but narrower.—J. Dufrenoy.

1154. DAVIS, W. H. *Urocystis Agropyri* on redtop. Mycologia 14: 279-281. 1 fig. 1922.—The author reports the occurrence of *Urocystis Agropyri* on *Agrostis palustris* collected in Wisconsin, and describes the sori and spores.—H. R. Rosen.

1155. DODGE, B. O. A *Lachnea* with a botryose conidial stage. Bull. Torrey Bot. Club. 49: 301-305. Fig. 1-7. 1922.—*Lachnea abundans* Karst. has asexual fructifications closely resembling *Botrytis*, the connection between the apothecial and conidial stages having been repeatedly established. The suggestion is made that "it is certainly dangerous to place too much weight on the asexual spore forms in determining relationship of their ascogenous stages."—P. A. Munz.

1156. DODGE, B. O. Studies in the genus *Gymnosporangium*. IV. Distribution of the mycelium and the subcuticular origin of the telium in *G. clavipes*. Amer. Jour. Bot. 9: 354-365. 1 pl., 7 fig. 1922.—Primary infection of *Gymnosporangium clavipes* on *Juniperus virginianum* occurs in the cuticularized layer of the epidermal cells of leaves and young stems. As the season advances, the hyphae penetrate into the mesophyll. In cork-covered stems the parasite is generally confined to the 2 or 3 outermost cell layers of the cortex. The main trunk may become infected by downward growth of hyphae from an infected branch. Characteristic binucleate haustoria occur in the cells of the epidermis and mesophyll. The first sori always appear either directly on the leaves or, more commonly, on the stems at the margins of the decurrent leaf bases or in the leaf axils. In later years, as cork is laid down on the stem, the sori are formed and break through in the ordinary manner. Sori on leaves and young stems are subcuticular to the extent that they arise in the cuticularized layer of the epidermal cells. As in other species studied by the author, the teliospore buds grow out from the subterminal cells of the basal primordium. The terminal cells, having become disorganized and swollen, function as buffer cells.—E. W. Sinnott.

1157. DOIDGE, ETHEL M. South African Ascomycetes in the National Herbarium. Part 2. *Bothalia* 1: 65-82. Fig. 1-8. 1922.—Thirty-five fungi are described including the following new species: *Catacauma Schotiae*, *Dictyochorella Andropogonis*, *Phyllachora Tecleae*, *P. myrsinicola*, *Telimena Arundinariae*, *T. corticicola*, *Systremma Pterocarpi*, *Meliola Carissae*, *M. oleicola*, *M. gemellipoda*, *Calothyrium Psychotriae*, *Asterina Crotonicola*, *A. Scolopiae*, *Lembosia piriensis*, *Trichopeltula Carissae*, *T. kentaniensis*, *Scolecopeltis Cassipoureae*, *Asterinella Mimuspodidis*, *Irene Rinoreae*, *I. Zeyheri*, *Clypeosphaeria natalensis*.—E. M. Doidge.

1158. DOSDALL, LOUISE. Occurrence of the pycnial stage of *Puccinia Taraxaci*. Bull. Torrey Bot. Club 49: 235-236. 1922.—The pycnial stage of *Puccinia Taraxaci* (Rabent.) Plow. is reported from Minnesota and Indiana and a description is given.—P. A. Munz.

1159. ELLIOTT, JESSIE S. BAYLISS. Studies in discomycetes. III. Trans. British Mycol. Soc. 7: 293-298. Fig. 1-2. 1922.—Ten species of discomycetes found in England are discussed.—W. B. McDougall.

1160. ELLIOTT, JOHN A. Some characters of the southern tuckahoe. Mycologia 14: 222-227. Pl. 17-18, fig. 1-2. 1922.—Clamp connections are noted on the mycelium, suggest-

ing a basidiomycete. A cut sclerotium imbedded in a greenhouse bench and later dug out showed a blackish root-like growth from the cut surface. When broken this rhizomorph exuded a milky fluid. Cultures from the peripheral regions of the sclerotium on cornmeal agar appeared as dark-brown, sterile, felty growths. Microscopic sections of the sclerotium show lactiferous ducts and glands.—*H. R. Rosen.*

1161. FAIRMAN, CHARLES E. New or rare fungi from various localities. *Proc. Rochester Acad. Sci.* 6: 117-139. *Pl.* 21-23. 1922.—The following are described as new: *Phomopsis rubiseda*, *P. fraterna*, *P. Trollii*, *Dendrophoma nigrescens*, *Sphaeronema epicaulon*, *Cytospora Nyssae*, *Sphaeropsis subconfluens*, *S. Opuntiae*, *Coniothyrium praeclarum*, *Didymochaeta columbiana*, *Microdipodia ilicigena*, *Stagonospora nyssaeicola*, *Hendersonia Arundinariae*, *Rhabdospora ilicigena*, *R. cryptosporopsis*, *Leptostroma Mitchellae*, *Heteropatella acerina*, *Discella zythiacea*, *Didymosporium propolidioides*, *Scolecosporium transversum*, *Graphium sordidiceps*, *Anthostomella endoxyloides*, *Diaporthe Hamamelidis*, *Didymosphaeria Loniceræ* var. *riparia*, *Melanomma nigriseda*, *Leptosphaeria lyciophila*, *L. Hamamelidis*, *L. pseudohleria*, *Sporormia ourasca*, *Cucurbitaria rimulina*, *Gloniopsis Lathamii*, *G. Lathamii* var. *asymetrica*, *Clasterosporium larviforme*, *Hendersonia foliorum* var. *hamamelidina*, *Cladosporium punctulatum* var. *xylogenum*, *Stemphylium subsphaericum*, *Exosporium scolecomorphum*, *Phoma Dioscoreae*. Two new genera, *Gamonaemella* and *Amblyosporiopsis*, each represented by a single new species, *G. divergens* and *A. parasphenoides* respectively, are described. The 1st differs from *Gamospora* in having smooth pycnidia, the 2nd differs from *Amblyosporium* in having the conidiophores apically dilated into heads and in having spores truncate only at one end.—*H. M. Fitzpatrick.*

1162. FAIRMAN, CHARLES E. The fungi of our common nuts and pits. *Proc. Rochester Acad. Sci.* 6: 73-115. *Pl.* 15-20. 1921.—The following new species or varieties are described: *Phomopsis carposchiza*, *Macrophoma Fitzpatrickiana*, *Rhabdospora baculum* var. *nucimaculans*, *Vermicularia exocarpinella*, *V. putaminicrustans*, *Pyrenochaeta nucinata*, *Dothiorella nucis*, *Sphaeropsis pallidula*, *Diplodina epicarya*, *Stagonospora nuciseda*, *S. nucidia*, *Pestalozzia nuciseda*, *Volutella caryogena*, *Cylindrium gossypinum*, *Monosporium avellaneum*, *Septocylindrium nuculinum*, *Coniosporium nucifodum*, *Didymella nucis-hicoriae*, *Melanopsamma Amphisphaeria* var. *carpogena*, *M. subrhombispora*, *Didymosphaeria nuciseda*, *Rhyncostoma nucis*, *Amphisphaeria nucidoma*, *Zignoella nucivora*, *Rhynchospaeria nucicola*, *Leptosphaeria exocarpogena*, *L. cacuminispora*, *Karschia elaeospora*. *Sphaeropsis Aesculi* Faut. & Roum. is transferred to the genus *Haplosporella*. A new genus, *Schizocapnodium* is described. Its affinities are in doubt, but it is placed near the Capnodiaceae. The spore split longitudinally, the halves falling apart. Many previously described species are here discussed.—*D. S. Welch.*

1163. FERDINANDSEN, C. En Blomkaalssvamp inden Dore (*Coniophora puteana*). [An indoor development of a fungus resembling *Sparassis*.] *Meddelel. For. Svampek. Fremme* 2: 104-105. 2 pl. 1920.—The author discusses a monstrosity of *Coniophora puteana* found growing on pine and spruce timbers under a floor. The largest specimens measured 9×6½ cm., weighed only 8.2 gm., and resembled a dry sponge in appearance.—*C. Ferdinandsen.*

1164. FERDINANDSEN, C., OG Ø. WINGE. En ny Kampeform af Elme Østershat (*Pleurotus ulmarius* (Bull.) Fr. f. *gigantea* nov. form.). [A new giant form of *Pleurotus ulmarius*.] *Meddelel. For. Svampek. Fremme* 2: 101-103. 1 fig. 1920.—The authors figure and give a Latin description of this monstrous agaric. The pileus reaches a diameter of 37 cm. and the stipe attains a length of 67 cm. The fungus was found in 3 succeeding years, late in autumn, in a Danish park. The fruit-bodies were partly hidden in, and partly emerging from, cavities in an old elm tree.—*C. Ferdinandsen.*

1165. FRASER, W. P. Cultures of heteroecious rusts, 1920-1921. *Mycologia* 14: 228-230. 1922.—"Inoculations with teliospores from *Spartina pectinata* Bosc. produced pycnia and



aecia on *Glauz maritima* L.," adding a new aecial host to *Puccinia Distichlidis*. Teliospores from *Distichlis stricta* produced pycnia and aecia on *Glauz maritima* and *Plantago eriopoda*, adding 2 new aecial hosts to the "pluriverous" rust, *Puccinia subnitens*.—H. R. Rosen.

1166. GRAFF, PAUL W. Philippine Basidiomycetes—V. Bull. Torrey Bot. Club 49: 223-233. 1922.—The Polyporeae are completed and records are given for many species. *Daedalea versatilis* (Berk.), *Heragonia Clemensiae* (Murr.), *H. subrubida* (Murr.), and *Gloeoporus reticulatus* (Fr.) are published as new combinations. In the Agaricineae various notes are given.—P. A. Munz.

1167. HASLER, ALFRED. Über die Entwicklungsgeschichte einiger Rostpilze. [On the life-histories of certain rusts.] Centralbl. Bakt. II. Abt. 54: 35-50. 1921.—The paper describes cultural studies on *Puccinia Lactucarum* and the following *Carex* rusts: *Puccinia serratulae-caricis* Kleb. on *Carex fulva* and *C. flava*; *P. urticae-pilosae* forma specialis on *Carex pilosa* and *C. frigida*; and *P. urticaefrigidae* on *Carex frigida* and *C. ferruginea*.—M. A. Raines.

1168. HEDGCOCK, GEORGE G., AND N. REX HUNT. Notes on some species of *Coleosporium* —I. Mycologia 14: 244-257. Pl. 20-21. 1922.—In order to prove or disprove the theory that species of pine act as bridging hosts for different species of *Coleosporium*, numerous inoculations were made, some of which are now recorded. It is shown that aeciospores and urediniospores of *C. Helianthi* can infect numerous species of *Helianthus*, but do not infect other composites, and in particular it was found that various species of *Coreopsis* were not infected. Likewise, aeciospores and urediniospores of *Coleosporium inconspicuum* infected only species of *Coreopsis*. This indicates that *Coleosporium Helianthi* and *C. inconspicuum* are distinct species. It is also found that *C. Helianthi* has a much wider distribution. The pycnial and aecial stages of *C. terebinthinaceae* and *C. laciniariae* are compared, and hosts of the former species are presented together with the geographic distribution. Numerous inoculation experiments with *C. delicatulum* indicate that only species of *Euthamia* act as uredinial and telial hosts and that various species of *Pinus* are susceptible. A list of hosts and geographic distribution are given for this species.—H. R. Rosen.

1169. HÖHNEL, F. VON. Vierte vorläufige Mitteilung mycologischer Ergebnisse (Nr. 305-398). [Fourth preliminary report of the results of mycological investigations.] Ber. Deutsch. Bot. Ges. 37: 107-115. 1919.—In this continuation of notes from Vol. 36 of this publication the author lists many genera and species with changes and corrections in synonymy. The names of the following genera appear: *Agaricus* (*Tricholoma*), *Russula*, *Peziza*, *Ungularia*, *Urceotella*, *Niptera*, *Pyrenopeziza*, *Mollisia*, *Dermatella*, *Cenangella*, *Belonidium*, *Tapesina*, *Chalara*, *Polydesmia*, *Leptobelonium*, *Belonium*, *Trichobelonium*, *Niesslella*, *Belonopsis*, (there is no morphological basis for the family *Caliciaceae*), *Stenocybe*, *Belonioscypha*, *Scelobelonium*, *Caliciopsis* (*Coryneliaceae*), *Capnodiella*, *Hypsotheca*, *Sorica*, *Sphinctrina*, *Phialea*, *Cyphelium*, *Scleroderris*, *Acolium* (*Cenangiaceae*), *Calicium*, *Coniocybe*, *Neolecta*, *Biatorella*, *Tromera* (*Helotiaceae*), *Steinia*, *Comesia* (*Comesiella*), *Patellea*, *Tapesia*, *Helotium*, *Patinella*, *Pseudohelotium*, *Tympanis*, *Godronia*, *Asterocalyx*, (*Tryblidiaceae*), *Arachnopeziza*, *Gorgoniceps*, *Eriopeziza* (*Trichopezizaceae*), *Pezizella*, *Ctenoscypha*, *Habrostictis*, *Pseudopeziza*, *Excipula*, *Orbilia*, *Orbiliopsis*, *Mollisia*, *Calycellina*, *Helotiopsis*, *Eubelonis*, *Phialina*, *Lachnobelonium*, *Dasyoscypha*, *Dasypezis*, *Psilachnum*, *Dyslachnum*, *Tubercularia*, *Beloniella*, *Belonopeziza*, *Cenangium*, *Nectria* (*Gibbera*), *Nitschkia*, *Melanomma*, *Phyllachora*, *Polystigma*, *Clype stigma*, *Echusias*, *Fracchiaca*, *Asterella*, *Microthyrium*, *Microthyriella*, *Myiocopron*, *Ellisiodothis*, *Microdothella*, *Melanobasidium*, *Calothyrium*, *Leptopeltis*, *Palawania* (*Polystomellaceae*), *Seynesia*, *Phragmothyrium*, *Calothyriopsis*, *Clypeolella*, *Lichenopeltella*, *Leptopeltella*, *Didymella*, *Othiella*, *Keissleriella* (*Cucurbitariaceae*), *Eriosphaeria*, *Melanopsamma*, *Melanopsammella*, *Gonytrichum*, *Acrospermum*, *Bombardistrum*, *Cyanoderma*, *Barya*, *Torrucciella*, *Ophionectria*, *Tubeufia*, *Physosporrellaceae* n. fam. (*Sphaeriaceae*), *Pemphidium*, *Merillipeltis*, *Oxydothis*, *Griphosphaeria*, *Anisostomula*, *Physosporella*, *Ceriospora*, *Lejosphae-*

**rella**, *Miyakeamyces*, *Calonectria* (Puttemansia), *Diaporthe*, *Othia*, *Cucurbitaria*, *Diatrype*, *Valsa* (*Leucostoma*), *Kalmusia*, *Leptosphaeria*, *Nodulisphaeria*, *Sphaeria*, *Sphaerella*, *Laestadia*, *Phacidium*, *Gnomonia*, *Ditopella*, *Rehmiella*, *Scleroplella*, *Discochora*, *Physalospora*, *Carlia*, *Phaeobotryon*, *Macrophoma* (*Coleophoma*), *Macrospora*, *Clathrospora*, *Rehmiellopsis*, *Mycosphaerella*, *Diplosphaerella*, *Hariotia*, *Hypostegium* *Catacauma*, *Fusarium*, *Cryptosporium*, *Phyllosticta*, *Gloeosporium*, *Aulacostroma*, *Lembosiodothis*, *Zignoëlla*, *Gilletiella*, *Haplotheeciella*, *Cladosporium*, *Stilbum*, *Dacryomyces*, *Dendrodochium*, *Microdiscula*, *Dendrophoma*, *Blennoria*, *Phyllostictina*, *Asteromella*, *Plectophoma*, *Stictochorella*, ***Dasystictella***, *Dasysticta*, *Aposphaeria*, *Cylindrophoma*, *Coleophoma* *Ceuthospora*, *Phoma*, *Septoria*, *Sphaeropsis*, *Hendersonia* (*Sphaerospora*), ***Naemostroma***, *Hysterium*, *Sclerophoma*, *Sporonema*, *Discella*, *Gloeosporium*, *Discoasporium*, *Pezizala*, *Ocellaria*, *Tuberculariella*, *Melanconis*, ***Discoasporina***, *Hymenula*, *Gloeosporidium*, *Myxosporina*, *Hysterostegiella*. In addition to the new genera included above (bold-faced type) the following new species are mentioned: *Keissleriella Aesculi*, *AcrospERMUM Adeanum*, *Othia Rubi*.—D. S. Welch.

1170. KILLERMANN, S. Funde von einigen Britzelmayrschen Cortinari. [Discovery of some of Britzelmayr's species of Cortinarius.] Krypt. Forsch. Bayer. Bot. Ges. München 5: 361-362. 1920.—During the last decade of the 19th century Britzelmayr described 72 new species of *Cortinarius*, most of which are now regarded as forms of previously described species. In the author's opinion, however, the following are valid: *C. albidocyaneus*, *C. apparens*, *C. disputabilis*, *C. evestigatus*, *C. odorifer*, *C. percognitus*, and *C. unimodus*. These species, together with *C. Cookei* Qué. and *C. splendidus* Peck, are briefly described from Bavarian material.—A. W. Evans.

1171. KILLERMANN, S. Morcheln und andere Helvellaceen aus Bayern. [Morels and other Helvellaceae from Bavaria.] Krypt. Forsch. Bayer. Bot. Ges. München 3: 148-154. 1 fig. 1918.—Following the example of Rehm, the author divides the Bavarian Helvellaceae upon which his report is based into the Rhizineae, the Geoglosseae, and the Helvelleae. Under the Rhizineae he lists a single species; under the Geoglosseae, 13 species in 9 genera; and under the Helvelleae, 22 species in 3 genera. Each species is accompanied by data regarding stations and collectors, by references to the literature, and usually by critical or descriptive notes. The figure represents a new form of *Mitula Rehmi* Bres., but no other novelties are described.—A. W. Evans.

1172. KILLERMANN, S. Nachtrag zu meinen trüffel- und Morchelfunden. [Additions to my discoveries of truffles and morels.] Krypt. Forsch. Bayer. Bot. Ges. München 4: 335-336. 1919.—The author publishes notes on 3 hypogaeous fungi and 4 members of the Helvellaceae found in various parts of Bavaria, 2 of which represent additions to the flora.—A. W. Evans.

1173. KILLERMANN, S. Ueber den Hexenpilz (*Boletus luridus* Schöff.) und Verwandte. [On the witch fungus (*Boletus luridus*) and its allies.] Krypt. Forsch. Bayer. Bot. Ges. München 4: 336-343. 3 fig. 1919.—The author discusses certain Bavarian species of *Boletus* belonging to the groups *Luridi* and *Colpodes* of Fries. In the 1st group he recognizes *B. luridus* Schaff., *B. rubeolaris* Bull., and *B. Satanus* Lenz as valid and, in the 2nd group, *B. pachypus* Fr., *B. calopus* Fr., and *B. torosus* Fr., although he expresses the opinion that the last may perhaps be a young form of *B. Satanus*. Under *B. rubeolaris* he includes *B. Lorinseri* G. Beck and *B. suspectus* as synonyms and *B. erythropus* (Pers.) Fr. as a variety, and under *B. Satanus* includes *B. macrosporus* Britzelmayr as a synonym and *B. lupinus* Fr. as a variety. The status of *B. appendiculatus*, *B. terreus*, and *B. olivaceus*, species proposed by Schäffer, is not altogether certain. The 1st, however, may be a form of the variable *B. subtomentosus* L., while the other 2 probably represent *B. calopus*. Full references to the literature accompany the article.—A. W. Evans.

1174. KINZEL, WILHELM. Über Hexenringe und die Bedingungen ihrer Entstehung. [On fairy rings and the conditions necessary for their formation.] Krypt. Forsch. Bayer. Bot.



Ges. München 3: 154-164. 1918.—The author describes the appearance of the so-called "fairy rings," caused for the most part by basidiomycetous fungi, and shows how they increase in size. He then discusses the conditions necessary for their formation and compares them with the rings of growth formed in artificial cultures by *Monilia fructigena* and similar fungi. The infection experiments carried out in the open by Münch, whereby fairy rings were artificially produced, bring out some of the most striking similarities between these 2 types of growth. At the close of the paper 22 species of fungi, associated with the formation of fairy rings, are enumerated.—A. W. Evans.

1175. KRIEGER, LOUIS C. C. Common mushrooms of the United States. Nation. Geog. Mag. 37: 387-439. 16 pl., 38 fig. 1920.—A non-technical discussion of mushrooms with descriptions is given as a basis for identification. Emphasis is placed on the question of edibility.—W. M. Atwood.

1176. MACCALLUM, B. D. Some wood-staining fungi. Trans. British Mycol. Soc. 7: 231-236. Pl. 8-9. 1922.—A brief historical review is followed by an account of the life history of *Ceratostomella Piceae*. Evidence is presented in support of the view that *Graphium penicillioides* is a stage in the life history of *Ceratostomella Piceae*.—W. B. McDougall.

1177. MAGNIN, HENRI. Récolte printanière de *Psalliota campestris* L. [An early collection of *Psalliota campestris*.] Bull. Trimest. Soc. Mycol. France 38: 56. 1922.—This fungus appeared March 15 in a garden which had been heavily manured the preceding November.—D. S. Welch.

1178. MANGENOT, G. A propos de quelques formes peu connues d'Endomycétacées. [Concerning some little known Endomycetaceae.] Bull. Trimest. Soc. Mycol. France 38: 42-55. Pl. 1-2, fig. 1. 1922.—*Endomyces Javanensis* Klöcker has a yeast-like mycelium and produces asci without a sexual process. *Endomyces Lindneri* Saito is typically parthenogenetic, but cases are found varying from permanent fusion of gametes (without nuclear fusion) to total absence of gametes. Parthenogenetic gametes frequently develop an ascomogenous hypha, often only a single cell. This perhaps indicates the place of origin of this structure in the phylogeny of the Ascomycetes. *Endomyces Hordei* is closely related to the above but is always parthenogenetic.—D. S. Welch.

1179. MARTIN, GEORGE W. *Rhizophidium Polysiphoniae* (Cohn) Peterson in the United States. Bot. Gaz. 73: 236-238. Fig. 1-10. 1922.—The author reports the occurrence of and describes the above species from a specimen of *Callithamnion* received from Barnegat Bay, New Jersey.—B. W. Wells.

1180. MAYOR, EUG. Une espèce biologique nouvelle du type de *Puccinia sessilis* Schneider. [A new biologic species of *Puccinia sessilis*.] Bull. Trimest. Soc. Mycol. France 38: 34-41. 1922.—*Puccinia Smilacearum-Festucae* is described with the following hosts: O and I found in nature on *Paris quadrifolia*, *Convallaria majalis*, *Polygonatum multiflorum*, *P. verticillatum*, and obtained in culture on *P. officinale*. The aecidial stage shows no biologic specialization. II and III develop only on *Festuca sativa*.—D. S. Welch.

1181. MOUNCE, IRENE. Homothallism and heterothallism in the genus *Coprinus*. Trans. British Mycol. Soc. 7: 256-269. 1922.—In continuing her previous studies on the genus *Coprinus*, the author concludes that *Coprinus sterquilinus* and *C. stercorarius* are homothallic whereas *C. lagopus* and *C. niveus* are heterothallic. Both of the latter probably sometimes give rise to homothallic strains.—W. B. McDougall.

1182. MURRILL, WILLIAM A. Dark-spored agarics—III. *Agaricus*. Mycologia 14: 200-221. 1922.—This is a key to 30 species of *Agaricus* with a description of each. Three new species are recognized: *A. alabamensis*, *A. comtuliformis*, and *A. rubribrunnescens*.—H. R. Rosen.

1183. MURRILL, WILLIAM A. Dark-spored agarics—IV. *Deconica*, *Atlyospora*, and *Psathyrella*. *Mycologia* 14: 258-278. 1922.—The present article deals with dark-spored agarics having a slender, tubular stipe with cartilaginous cortex, and not furnished with an annulus. Those having decurrent gills are placed in the genus *Deconica*, 9 species being listed, including *D. tomentosa* sp. nov., *D. polytrichophila* (Peck) comb. nov., and *D. pyrispora* sp. nov. Of the forms having adnate or adnexed gills those with purplish-brown or dark-fuscous spores are placed in the genus *Atlyospora* (*Psathyra*), in which 7 species are recognized: *A. microsperma* (Peck) comb. nov., *A. vestita* (Peck) comb. nov., *A. multipedata* (Peck) comb. nov., *A. prunuliformis* sp. nov., *A. australis* sp. nov., *A. umbonata* (Peck) comb. nov., and *A. striatula* sp. nov. Seventeen black-spored species are placed in *Psathyrella*, including *P. castaneicolor* sp. nov., *P. petasiformis* sp. nov., and *P. distantifolia* sp. nov.—H. R. Rosen.

1184. OVERHOLTS, L. O. Mycological notes for 1920. *Bull. Torrey Bot. Club* 49: 163-173. Pl. 9, fig. 1-14. 1922.—Notes and records are given for *Zythia resinæ* (Ehrenb.) Karst., *Biotorella resinæ* (Fr.) Mudd, *Pilacre Petersii* B. & Br., *Tulasnella Violæ* (Quél.) Boud. & Gal., *Dacryomyces hyalina* Quél., *Stereum radiatum* Peck, *Merulius fugax* Fr., *Solenia fasciculata* (Pers.) Fr., *Polyporus caeruloporus* Peck, and *Fomes Bakeri* Murrill. *Polyporus compactus* is described as a new species.—P. A. Munz.

1185. PAUL, H. Vorarbeiten zu einer Rostpfl.- (Uredineen-) Flora Bayerns. 2. Beobachtungen aus den Jahren 1917 und 1918, sowie Nachträge zu 1915 und 1916. [Preliminary studies for a rust flora of Bavaria. 2. Observations for the years 1917 and 1918, as well as additions for 1915 and 1916.] *Krypt. Forsch. Bayer. Bot. Ges. München* 4: 299-334. 1919.—The 1st paper of this series, dealing with observations on the rust flora of Bavaria for the years 1915 and 1916, appeared in 1917. In the 2nd paper most of the observations recorded are for 1917 and 1918 although a few of earlier date are included. The species listed total 281 and increase the number of rusts now known in Bavaria to over 300. The genera recognized number 21, those best represented being *Puccinia*, *Uromyces*, and *Melampsora*. Each species is accompanied by full data regarding stations, collectors' names, dates, host-plants, and (where necessary) types of spore-forms collected.—A. W. Evans.

1186. PEYRONEL, BENIAMINO. Nouveaux cas de rapports mycorrhiziques entre Phanerogames et Basidiomycètes. [Mycorrhizal relationships between phanerogams and basidiomycetes.] *Bull. Trimest. Soc. Mycol. France* 37: 143-146. 1921.—It is believed that the number of fungi producing mycorrhizae is great. About 20 basidiomycetes have been reported. In an unpublished note the author has pointed out 13 more and in the present paper is given an additional list of 19, mostly from the genera *Amanitopsis*, *Russula*, *Lactarius*, and *Boletus*. Depending upon the nature of the terrain as much as the individual species, both macroscopic and microscopic methods are employed to determine the connection between the mycorrhizal covering (mycochlène) on the host and the hymenophore of the fungus.—D. S. Welch.

1187. PEYRONEL, BENIAMINO. Un ifomicete dai conidi mesoendogeni: *Menispora microspora* n. sp. [A hyphomycete with mesoendogenous conidia: *Menispora microspora* n. sp.] *Atti R. Accad. Lincei Roma Rendiconti* (Cl. Sci. Fis. Mat. e Nat.) 30<sup>a</sup>: 29-32. Fig. 1-12. 1921.—A hyphomycetous fungus found on chestnut bark is described as *Menispora microspora* n. sp., being distinguished by the small size of the conidia. The latter measure  $10-12 \times 1.5-2.25\mu$  for the most part. Flask-shaped bodies (conidiogenes) with a funnel-shaped neck (stomidium) are borne principally at the tips of the conidiophores. The conidia are formed from the protoplasm of the conidiogene, the protoplasm being forced out through the neck to form the spores one after another. These the author calls mesoendogenous conidia.—F. M. Blodgett.

1188. ROSEN, H. R. *Tilletia texana* in Missouri. *Ann. Missouri Bot. Gard.* 8: 357-359. 1921.—The occurrence of this species in Missouri is cited and notes of a monographical nature are given.—S. M. Zeller.



1189. ROSTRUP, OVE. To for Danmark nye Pigsvamp-Arter. [Two *Hydnum* species new to Denmark.] Meddelel. For. Svampek. Fremme 2: 93-95. 2 fig. 1920.—The species in question are *H. aurantiacum* Fr. and *H. friabile* nov. nom. The latter has hitherto been called *H. fragile*. The author gives arguments for the necessity of a new name.—C. Ferdinandsen.

1190. SEAVER, FRED J. Studies in tropical Ascomycetes—I. *Neopeckia diffusa* and *Herpotrichia albidostoma*. Mycologia 14: 235-238. Pl. 19. 1922.—Synonyms and description of each species are given. The genus *Neopeckia* is said to differ from *Herpotrichia* "in that the spores are never more than 1-septate while in the latter they show a tendency to become more than 1-septate."—H. R. Rosen.

1191. SHEAR, C. L. Life history of an undescribed ascomycete isolated from a granular mycetoma of man. Mycologia 14: 239-243. 3 fig. 1922.—Crushed granules from diseased tissue of an ankle showed fungus hyphae to be present. Transfers to culture media gave apparently pure cultures of the fungus, although no successful infections resulted when inoculated into guinea pigs. The fungus grows readily on ordinary culture media such as cornmeal agar and in a few weeks produces 3 spore forms, 2 conidial and 1 perithecial. The 1st to appear is a *Cephalosporium* stage, named *C. Boydii*, followed by the perfect stage, *Allescheria Boydii*, which in turn is followed by a conidial form, *Dendrostilbella Boydii*. In the technical description of the fungus the author adopts a system of Roman numerals for the various stages somewhat comparable to the manner in which these are used by uredinologists. Thus I indicates an ascogenous fructification, II a pycnidial stage, III a conidial form; and when more than one pycnidial or conidial form occurs in the life cycle this is indicated by an alphabetical exponent, as III<sup>a</sup> and III<sup>b</sup>.—H. R. Rosen.

1192. SOUTH, F. W. An important root disease on Borneo camphor. Agric. Bull. Federated Malay States 9: 34-36. 1921.—An account is presented of *Rosellinia bunodes* attacking *Dryobalanops Camphora*.—I. H. Burkill.

1193. TANAKA, TYÔZABURÔ. New Japanese fungi—Notes and translations—XII. Mycologia 14: 282-295. 1922.—The following species of *Gymnosporangium* are described: *G. asiaticum* Miyabe with pycnia and aecia on *Pyrus sinensis* and *Cydonia vulgaris* and telia on *Juniperus chinensis* and *J. chinensis* var. *procumbens*; *G. Yamadae* Miyabe with pycnia and aecia on *Pyrus Malus*, *P. spectabilis*, and *P. Toringo*, and telia on *Juniperus chinensis* and *J. chinensis* var. *procumbens*; *G. Idetae* Yamada ex K. Hara with pycnia and aecia on *Amelanchier asiatica* and telia on *Juniperus rigida*; *G. hemisphaericum* K. Hara with pycnia and aecia on *Pyrus Zumi* and telia on *Juniperus chinensis*; *G. Shiraianum* K. Hara with pycnia and aecia on *Pyrus sinensis* and telia on *Juniperus littoralis*. A synopsis and key are given of Japanese species of *Gymnosporangium*.—H. R. Rosen.

1194. VAN HOOK, J. M. Indiana fungi—V. Proc. Indiana Acad. Sci. 1920: 209-214. 1921.—The present paper consists of a list of 68 species of fungi collected in Indiana. Under those listed no attempt has been made to fully describe the species, but variations from original descriptions have been noted or descriptions extended in the following: *Daedalea extensa* Pk., *Ceratostomella barbirostris* (Duf.) Sacc., *C. echinella* E. & E., *Hypoxylon perforatum* (Schw.) Fr., *Phyllosticta Smilacis* E. & E., *Septoria albanensis* Thuem., *Vermicularia Dematium* (Pers.) Fr. var. *microspora* n. var., *Cylindrosporium Scrophulariae* Sacc. & Ell., *C. Ulmicolum* E. & E., *Gloeosporium Betularum* Ell. & Mart., *Ramularia arvensis* Sacc.—F. C. Anderson.

1195. VAN HOOK, J. M. The pycnidium of *Cicinnobolus*. Proc. Indiana Acad. Sci. 1920: 215-216. Fig. 1-3. 1921.—While *Cicinnobolus* has been heretofore described for the most part as infecting only conidiophores, in the case of *Podosphaera oxycanthae* (DC.) de Bary it occurs apparently only on the perithecia, considerably altering their structure.—J. M. Van Hook.

1196. WINGE, Ø. Om nogle hyppigt forvekslede Rorhat-Arter. [On certain frequently confused *Boletus* species.] Meddelel. For. Svampekl. Fremme 2: 96-100. 1 fig. 1920.—A brief discussion is given of the characters and identity of 3 Danish species of *Boletus*: *B. aereus* Bull., *B. luridus* Schaeff., and *B. erythropus* Pers.—C. Ferdinandsen.

1197. WORMALD, H. Observations on a discomycete found on medlar fruits. Trans. British Mycol. Soc. 7: 287-293. Figs. 1-2. 1922.—A discomycete found on medlar fruits was found to differ only slightly from *Sclerotinia Mespili* and is believed to be the ascigerous stage of *Mespilus germanica*.—W. B. McDougall.

1198. ZELLER, S. M. Contributions to our knowledge of Oregon fungi—I. Mycologia 14: 173-199. 6 figs. 1922.—A list of 204 species, mostly Eubasidiomycetes, including the following: *Cyphellia marginata* McAlpine, reported for the first time in this country on twigs of peach, apple, and almond; *Merulius pilosus* Burt sp. nov., a buff colored species possessing gloeocystidia; *L. picta pulcherrima* sp. nov., possessing a reddish colored pileus and a peronate stem; *Tricholoma subannulata* (Peck) comb. nov., described by Peck as an *Armillaria*; *Stropharia rugomarginata* Zeller & Epling sp. nov., with a reticulate-rugose margin of the pileus; *Scleroderma hypogaeum* sp. nov., possessing alveolate-reticulate spores; and *Gautieria Parksiana* Zeller & Dodge sp. nov.—H. R. Rosen.

## LICHENS

1199. BURNHAM, STEWART H. Lichens of the Lake George region. Concluded. Bryologist 25: 72-80. 1922.—The scope of this series of articles has already been outlined [see. Bot. Absts. 11, Entries 4273-4274]. The present installment enumerates 107 species and varieties, with full data of collection. *Haematomma elatinum ochrophaeum* (Tuck.) Merr. & Burn., *Candelaria concolor effusa* (Tuck.) Merr. & Burn., *Parmelia tiliacea subquercifolia* (Hue) Merr. & Burn., *Caloplaca aurantiaca flavovirescens* (Wulf.) Burn., *C. cerina sideritis* (Tuck.) Merr. & Burn., *Physcia fusca detrita* (Fr.) Burn., *P. orbicularis endococcina* (Koerb.) Burn., and *Placynthium Petersii* (Tuck.) Burn. are proposed as new combinations.—E. B. Chamberlain.

1200. KNIGHT, H. H. Lichens of Haslemere district. Trans. British Mycol. Soc. 7: 225. 1922.—A list of 66 species of lichens collected near Haslemere, Surrey, during the spring foray of 1921, is given.—W. B. McDougall.

1201. LYNGE, BERNT. Studies on the lichen flora of Norway. Videnskabselskab. Skrifter (Mat.-Nat. Kl.) 1921: 1-252. Pl. 1-13, fig. 1-5, 65 maps. 1921.—The author recounts the distribution of all non-crustaceous lichens in Norway (with the exception of the Physciaceae, with which the author has previously dealt [Videnskabselskab. Skrifter (Mat.-Nat. Kl.) 1916]). Under each species is given a survey of its various subspecies, varieties, and forms belonging to the Norwegian flora, and the distribution of each separate form is represented as accurately as possible. Though the lichen flora of several parts of the country is still imperfectly known, the main features of distribution can be clearly shown in most cases. The new varieties described and new combinations of names established are: *Parmelia Bitteri* nom. nov. (*P. obscurata* Bitter, non Ach.), *P. Bitteri* var. *isidiata* nov. var., *P. Scorea* Ach. f. *borealis* Lynge, *P. fraudans* Nyl. f. *caesiopruinosa* f. n., *P. excrescens* (Arn.) var. *pilosella* comb. nov., *Cetraria lacunosa* f. *norvegica* f. n., *Alectoria samentosa* Ach. f. *sorediata* f. n. Critical remarks or amplified diagnoses are given in many cases. In the preface a brief survey of previous investigations on the lichen flora of Norway is given, and in 2 introductory chapters the author treats of the economic uses of the lichens in Norway and the general features of the distribution of the lichen flora of the country. He divides the species into 2 chief groups: those of the Coast Flora and those of the Inland Flora, each with several subdivisions. The distribution of 65 selected species is represented on the maps accompanying the paper. In an appendix KRISTIAN NISSEN has given a survey of the Lapponian lichen names.—Jens Holmboe.



1202. RUESS, JOHANN. Die Einteilung der Cladonien. [The classification of the Cladoniae.] Krypt. Forsch. Bayer. Bot. Ges. München 3: 164-166. 1918.—The author calls attention to the various methods of classification that have been proposed for the species of *Cladonia*, and emphasizes the difficulties of arranging the species of extensive areas in a single system. He therefore recommends classifications adapted to the species of restricted areas, and the method which he here suggests is based on the species of Germany. He divides them into 3 groups, as follows: "Grossblättrige" (large-leaved), referring to the primary thallus, with 4 species; "Kleinblättrige" (small-leaved), with 22 species; and "Krustenflechte" (crustaceous lichen), with 1 species.—A. W. Evans.

## BACTERIA

1203. BROWNE, W. W. Halophilic bacteria. Proc. Soc. Exp. Biol. and Med. 19: 321-322. 1922.—The red coloration on salt fish is due to 2 organisms, *Spirochaeta halophila* producing a pale pink coloration and *Bacterium halophilica* causing a transparent red. Optimum concentration of salt is saturation. The size, shape, and motility of the organisms is dependent upon the salt concentration. The optimum temperature is 50-55°C. Both forms tolerate indefinite exposure to brightest sunlight. They are present in solar evaporated salt. Sea salts from all over the world contain similar organisms.—D. S. Welch.

1204. HELLER, HILDA HEMPL. Classification of the anaerobic bacteria. Bot. Gaz. 73: 70-79. 1922.—The previously existing ideas regarding the mutability and stability of anaerobic bacteria are discussed. It is pointed out that if bacteria do not lack one of the best recognized attributes of living matter, they must possess the ability to mutate. Then it is necessary to determine where the mutations of bacteria lie, and what range of characters they cover before it can be determined what characters are stable enough for systematic purposes. It is suggested that the following general rules should be found convenient in classifying bacteria: (1) Strains which differ from each other in characters which are readily subject to mutation and that breed true, may be termed biotypes. (2) Strains which behave alike in those characters that fall within a genus and have not been found to mutate readily, may be grouped as species. (3) Organisms which show the same general reactions on ordinary media and that have the same general morphological habit, may be grouped in genera. The distinguishing characters of 2 sub-families and 1 family including all of the genera are given.—I. V. Shunk.

## MYXOMYCETES

1205. SANDERSON, A. R. Notes on Malayan Mycetozoa. Trans. British Mycol. Soc. 7: 239-256. 1922.—This paper deals with myxomycetes collected in that part of the Malayan Peninsula which lies between north latitude 1° and 6° and east longitude 100° and 104°. Large tracts of virgin forest in this area have been cut down and the land cleared and set out to plantations of *Hevea brasiliensis* or of coconut. In collecting myxomycetes special attention was given to these plantations. About 70 species are listed, most of them with notes on habitats. Tables are given showing the months in which the various species were collected and the habitats in which they were found.—W. B. McDougall.

1206. SEAVER, F. J. [Rev of: MACBRIDE, T. H. North American slime-moulds. 299 p., 23 pl. Macmillan Co: New York, 1922 (see Bot. Absts. 11, Entry 3446).] Mycologia 14: 233-234. 1922.—"In matters of nomenclature the author has not followed hard and fast rules, but has apparently attempted to use the oldest recognizable specific names without regard to rule or date. . . . One other very commendable feature of the book is the extensive notes and observations which supplement the technical descriptions."—H. R. Rosen.

## PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

1207. BERRY, EDWARD W. Contributions to the paleobotany of Peru, Bolivia and Chile. Johns Hopkins Univ. Studies Geol. 4. 219 p., 25 pl., 9 fig. 1922.—This includes the following papers: (1) Carboniferous plants from Peru, the 1st descriptive account of plants of this age from South America. The flora includes: *Palmatopteris furcata*, *Eremopteris whitei*, *Eremopteris peruvianus*, *Calamites suckowii*, *Calamostachys* sp., *Lepidodendron rimosum*, *L. obovatum*, *Lepidophyllum* sp., *Lepidostrobus* sp., *Stigmaria* sp., and *Knorria* sp. These occur at Paracas on the southern coast of Peru and indicate a former greater westward extent of the continent and a Westphalian age. (2) The Mesozoic flora of Peru, which contains a summary of the known Mesozoic plants of Peru, representing the genera *Equisetites*, *Taeniopteris*, *Ruffordia*, *Filicites*, *Cladophlebis*, *Sphenopteris*, *Weichselia*, *Klukia*, *Otozamites*, *Zamiosirobros*, *Cycadolepis*, *Podozamites*, *Thuites*, *Brachyphyllum*, and *Antholithus*. *Weichselia peruviana*, *Klukia zeilleri*, *Otozamites peruvianus*, *Otozamites zeilleri*, and *Thuites leptocladus* are described in detail. The age is considered as probably Portlandian. (3) the flora of the Concepcion-Arauco Coal Measures of Chile. This detailed geological and botanical discussion of the lower Miocene flora of the so-called Navidad beds of southern Chile includes 5 ferns representing *Gleicheniaceae*, *Cyatheaceae*, and *Polypodiaceae*; 4 gymnosperms, including *Zamia*, *Araucaria*, and *Sequoia*; 2 palms; and representatives of the following dicotyledonous families: *Piperaceae*, *Moraceae*, *Loranthaceae*, *Anonaceae*, *Myristicaceae*, *Caesalpinaceae*, *Papilionaceae*, *Erythroxylaceae*, *Rutaceae*, *Meliaceae*, *Vochysaceae*, *Euphorbiaceae*, *Ilicaceae*, *Celastraceae*, *Sapindaceae*, *Tiliaceae*, *Bombacaceae*, *Dilleniaceae*, *Ochnaceae*, *Flacourtiaceae*, *Lauraceae*, *Combretaceae*, *Lecythidaceae*, *Myrtaceae*, *Myrsinaceae*, *Styracaceae*, *Apocynaceae*, *Boraginaceae*, and *Rubiaceae*. New species of *Cyathoides*, *Araucaria*, *Cassia*, *Triumfetta*, *Nectandra*, and *Goeppertia* are described. This flora is distinctly Amazonian in character and its bearing on former climatic and geographic conditions and upon the time of uplift of the Andes is fully discussed. (4) Pliocene fossil plants from eastern Bolivia. This flora, found at an altitude of 11,800 feet, includes 3 ferns representing the *Gleicheniaceae* and *Polypodiaceae*; 2 monocotyledons, *Heliconia* and *Iriartites*; and dicotyledons representing the genera *Coussapoa*, *Pisonia*, *Anona*, *Cassia*, *Pithecolobium*, *Pilocarpus*, *Saccoglottis*, *Protium*, *Mespilodaphne*, *Myrica*, *Sideroxylon*, *Chrysophyllum*, and *Cedrela* or *Sapindus*. These are fully discussed in their geological and botanical aspects, and the conclusion is reached that the minimum amount of Andean uplift since this flora lived in this region is 6,500 feet. The following species are described as new: *Goniopteris cochabambensis*, *Filicites elaphoglossoides*, *Gleichenia pectinata fossilis*, *Heliconia tertiaria*, *Iriartites boliviensis*, *Coussapoa pliocenica*, *Pisonia pliocenica*, *Anona cochabambensis*, *Pithecolobium palcanum*, *Cassia pisllypampensis*, *Cassia coriacea*, *Cassia palcana*, *Pilocarpus bolivianus*, *Protium fossilium*, *Saccoglottis tertiaria*, *Mespilodaphne boliviana*, *Myrica pliocenica*, *Sideroxylon pliocenicum*, and *Chrysophyllum crassum*. (5) Late Tertiary plants from Jancocata, Bolivia. Characteristics and geological and climatic bearing of the following new species are discussed: *Pteris pacajensis*, *Phragmites* sp., *Alnus preacuminata*, *Osteomeles kozlowskiana*, *Polylepis tomentellifolia*, *Calliandra jancocatana*, *Cassia altoensis*, *Caesalpinia jancocatana*, and *Melastomites* sp.—E. W. Berry.

1208. BERRY, EDWARD W. Environmental interpretation of fossil plants. Pan Amer. Geol. 38: 9-17. 1922.—The author discusses criteria and methods of interpreting past physical environments by means of fossil plants.—E. W. Berry.

1209. CHANDLER, M. E. J. *Sequoia Couttsiae* Heer, at Hordle, Hants: a study of the characters which serve to distinguish *Sequoia* from *Athrotaxis*. Ann. Botany 36: 385-391. 5 fig. 1922.—A careful study of the differences between *Athrotaxis* and *Sequoia* was begun as a result of the discovery that material from the Lower Headon Beds at Hordle, England, which had been referred to *Athrotaxis* by Gardner, was really *Sequoia*. The differences between the 2 genera in leaves, cone-scales, and seeds are described, and it is stated that in all these structures the fossil agrees with *Sequoia*.—W. P. Thompson.



1210. COCKERELL, T. D. A. A new genus of fossil Liliaceae. Bull. Torrey Bot. Club 49: 211-213. Fig. 1. 1922.—The fossil material from Florissant, Colorado, which has passed as *Tmesipteris Alleni* (Lesq.) Hollick and which was referred to *Carpolithes* in 1913 by Cockerell, is now referred to *Brachyruscus* gen. nov.—P. A. Munz.

1211. DACHNOWSKI, ALFRED P. The correlation of time units and climatic changes in peat deposits of the United States and Europe. Proc. Nation. Acad. Sci. [U. S. A.] 8: 225-231. 1922.—Successive layers of different kinds of peat ("forest, fibrous sedge and reed, and colloidal") in postglacial deposits, both in the U. S. A. and in Europe, indicate the succession of different types of vegetation and therefore of different climatic conditions. The evidence from peat deposits combines with other geological evidence to indicate that well-marked stages, during and since the last Ice Age, were nearly simultaneous in northern America and northern Europe. From the combined evidence much may be inferred as to the chronology of these climatic and vegetational changes and of the stages of human culture associated therewith in Europe. A northward trend of civilization and agriculture seems to have continued for the last 60 centuries. Utilization of American peat lands should be facilitated by study of related European deposits.—Howard B. Frost.

1212. FRITEL, P. H. Contributions à l'étude du genre *Nipadites* Bowerbank et sur sa distribution géographique et stratigraphique. [Study of the genus *Nipadites* and its geographic and stratigraphic distribution.] Bull. Soc. Geol. France 21: 317-321. Pl. 16. 1922.—The author refers the genera *Castellinia* Massalongo 1852, *Fraçastoria* Massalongo 1858, and *Palaeokeura* Massalongo 1854, described originally as many species of fossil fruits coming from the middle Eocene of Italy, to the palm genus *Nipadites*, and discusses the geographic and geologic range of this littoral genus.—E. W. Berry.

1213. HEMMER, A. Die fossile Flora des Oberen Ottweiler Schichten des Saarbeckens. [The fossil flora of the upper Ottweiler beds of the Saar basin.] Geog. Jahreshfte 1918/1919: 263-298. Pl. 6-10. 1920.—The author describes or comments on fossil plants found in the upper Ottweiler or Breitenbacher beds of the Saar basin. These comprise the uppermost Carboniferous of the basin and are probably of late Stephanian age. The genera mentioned and the number of species of each are as follows: 25 *Pecopteris* (1 new), 11 *Sphenopteris* (1 new), 2 *Diplotmema*, 3 *Odontopteris*, 7 *Alethopteris* (2 new), 2 *Callipteridium*, 1 *Callipteris*, 1 *Neuropteris*, 1 *Linopteris* (new), 1 *Aphlebia*, 5 *Sphenophyllum*, 2 *Calamites* (1 new), 2 *Annularia* (1 new), 3 *Asterophyllites*, 2 *Palaeostachya*, 1 *Macrostachya*, 1 *Equisetites*, 3 *Lepidostrobus*, 1 *Lepidophyllum*, 1 *Lepidophloios*, 3 *Sigillaria*, 1 *Sigillaristrobus*, 1 *Stigmaria*, 1 *Pterophyllum*, 1 *Rhabdocarpus*, 1 *Trigonocarpus*, and 1 *Samaropsis*.—E. W. Berry.

1214. HOWE, MARSHALL A., and ARTHUR HOLLICK. A new American fossil hepatic. Bull. Torrey Bot. Club 49: 207-209. Fig. 1. 1922.—*Jungermanniopsis* gen. nov. and *J. Cockerellii* sp. nov. are published for a specimen from Miocene shale of Florissant, Colorado.—P. A. Munz.

1215. McLEAN, R. C. On the fossil genus *Sporocarpion*. Ann. Botany 36: 71-90. Pl. 8-10. 1922.—The author discusses the genus *Sporocarpion*, first described by Williamson, and elaborates and extends the evidence advanced in a paper published in 1912 for considering these remains to represent not plants, but a group of extinct radiolarian Protozoa, which became specialized for inhabiting the organically charged fresh and brackish waters of the Carboniferous lagoons.—E. W. Berry.

1216. RUEDEMANN, RUDOLPH. New forms of life from the Silurian. Proc. Nation. Acad. Sci. [U. S. A.] 8: 55-56. 1922.—Fossils recently obtained from the Bertie waterline and the Lockport limestone of New York include the following: algae with air bladders, primitive land plants, and graptolites (*Dictyonema* and *Inocaulis*).—Howard B. Frost.

1217. SEWARD, A. C. On a collection of Carboniferous plants from Peru. Quart. Jour. Geol. Soc. London 78: 278-283. Pl. 13, 1 fig. 1922.—The author describes the following indefinite remains from Paracas, Peru, and suggests that they are lower Carboniferous in age *Sphenopteris* sp., *Lepidodendron* sp., *Sigillaria* or *Lepidodendron*, and *Bothrodendron* sp.—E. W. Berry.

1218. SEWARD, A. C., AND R. E. HOLTUM. Jurassic plants from Ceylon. Quart. Jour. Geol. Soc. London 78: 271-277. Pl. 12. 1922.—The paper records the following well known species from the lower Oolite (Jurassic) of Ceylon: *Cladophlebis reversa*, *C. denticulata*, *Taeniopteris spatulata*, *Araucarites cutchensis*, *Brachyphyllum mamillare*, *Elatocladus plana*, and *Desmophyllum* sp.—E. W. Berry.

1219. YABE, H. Notes on some Mesozoic plants from Japan, Korea and China, in the collection of the Institute of Geology and Paleontology of the Tôhoku Imperial University. Sci. Rept. Tôhoku Imp. Univ. 7: 1-28. Pl. 1-4. 1922.—The author describes the Permian forms. *Annulariopsis inopinata* Zeiller and *Sphenophyllum sinocoreanum* n. sp. from beds in Korea regarded as lower Triassic in age, and the following forms from Mesozoic beds in China, Japan, and Korea: *Ruffordia goepperti*, *Cladophlebis browniana*, *C. geyleriana*, *C. lobifolia*, *C. denticulata*, *C. distans*, *C. nebbensis*, *C. argutula*, *C. haiburnensis*, *Pterophyllum inconstans*, *Clathropteris* c. f. *meniscoides*, *Zamiophyllum buchianum*, *Ctenis* (?) sp., *Ginkgo sibirica*, *Baiera* (?) *concinna*, *Phoenicopsis angustifolia media*, *Frenelopsis* c. f. *hohenneggeri*, and *Elatocladus manchuricus*.—E. W. Berry.

## PATHOLOGY

FREDERICK V. RAND, *Editor*

LILLIAN C. CASH, *Assistant Editor*

(See also in this issue Entries 939, 949, 972, 990, 998, 1014, 1015, 1025, 1028, 1031, 1032, 1033, 1042, 1079, 1081, 1085, 1112, 1124, 1136, 1137, 1138, 1142, 1143, 1144, 1146, 1153, 1154, 1156, 1158, 1162, 1165, 1167, 1168, 1180, 1185, 1188, 1192, 1193, 1197, 1198, 1393, 1403, 1406, 1419, 1422, 1492, 1496, 1499, 1503, 1504, 1525)

## DISEASES CAUSED BY FUNGI

1220. ANONYMOUS. "Damping off" and "foot rot" of the tomato. Exp. and Res. Sta. Nursery and Market Gard. Industries,—Development Soc., Ltd., Turner's Hill, Cheshunt, Herts Ann. Rept. 7: 38-39. 1921.—A number of organisms are responsible, particularly *Phytophthora cryptogea* and *P. parasitica*. The disease organisms are transmitted through the soil, water, pots, and seed boxes. In addition to mentioning the heat and formaldehyde methods of soil sterilization, the author describes a preparation, Cheshunt Compound, which can be applied to the soil while the plants are growing. It controls the disease without injury to the plants. This preparation consists of finely powdered copper sulphate (2 ounces) and ammonium carbonate (11 ounces) mixed and stored in a sealed glass or stone jar 24 hours or longer. One ounce is then dissolved in a little hot water and water added to make 2 gallons. Promising results have also been obtained with this solution in the control of *Verticillium albo-atrum*, *Fusarium* sp., and *Rhizoctonia*.—W. H. Tisdale.

1221. ANONYMOUS. Leaf spot or anthracnose of cucumber. Exp. and Res. Sta. Nursery and Market Gard. Industries,—Development Soc., Ltd., Turners' Hill, Cheshunt, Herts Ann. Rept. 7: 32-38. 1921.—The life history of the causal organism, *Colletotrichum oligochaetum*, which attacks all parts of the host plant, is given, and the disease and the factors influencing its development under greenhouse conditions are described. Control measures include sanitation, disinfection, and cultural methods.—W. H. Tisdale.



1222. ANONYMOUS. New York observations on take-all. [Rev. of: KIRBY, R. S. The take-all disease of cereals and grasses. *Phytopathology* 12: 66-68. 1922 (see Bot. Absts. 11, Entry 4364).] *Agric. Gaz. New South Wales* 33: 566. 1922.

1223. AJREKAR, S. L., AND D. V. BAL. Observations on the wilt disease of cotton in the Central Provinces. *Agric. Jour. India* 16: 598-617. *Pl.* 33-34. 1921.—Two strains of a species of *Fusarium* were isolated from wilted cotton plants and their causal connection with the wilt disease established by inoculation experiments. Besides the usual *Cephalosporium* and *Fusarium* type of spores and chlamydospores, these 2 strains produce on culture media sclerotium- or perithecium-like bodies which differ in color. The reputed immunity of buri cotton was tested and confirmed. An attempt to ascertain whether the wilting of the cotton plant was due to any toxins secreted by the fungus gave negative results. The feasibility of different suggested methods of controlling the disease in the field is discussed in the light of the observations recorded.—A. Howard.

1224. BELGRAVE, W. N. C. Notes in the "South American leaf disease" of rubber. *Agric. Bull. Federated Malay States* 9: 179-183. 1921.—A review is given of published data on the disease of rubber attributed to *Fusicladium macrosporium* (Syn., *Passalora Heveae* and *Melanopsammopsis Ulei*), which attacks *Hevea brasiliensis*, *H. confusa* and *H. guyanensis*. A brief account of the author's observations and of the present position of the disease is appended.—I. H. Burkill.

1225. BARNUM, CLYDE C. Stem end rot of apples. *Science* 55: 707-708. 1922.—Apples have been found with decayed spots at and near the base of the stems. The fruit becomes covered with green spores, which were also found on the stems of fruit in cold storage. Cultures proved the mold to be *Penicillium expansum* Link., which ordinarily is thought to enter only through abrasions.—Inoculation experiments proved that this mold infects healthy apples and produces the same type of decay as was first found. The writer observes that such rot is rather common in California.—C. J. Lyon.

1226. BLAIR, R. J. Chemical woodpulp is attacked by molds. *Quebec Soc. Protection Plants Ann. Rept.* 14: 39-41. *Fig.* 1-3. 1922.—Small discolored spots are found in the sheets of chemical pulp, and if the discoloration spreads the product is worthless.—B. T. Dickson.

1227. BROWN, J. G. Cytospora canker, a disease destructive to cottonwoods and poplars. *Arizona Agric. Exp. Sta. Timely Hints for Farmers* 138. 4 p. 2 fig. 1922.—Of the Arizona cottonwoods and poplars, *Populus nigra* var. *italica* and *P. Fremontii* var. *Wislizeni* are least susceptible to attack by *Cytospora chrysosperma*. *Populus alba* var. *nivea* and *P. deltoides* are very susceptible. The canker also occurs on *P. MacDougalii*, *P. angustifolia*, *P. tremuloides*, *P. grandidentata*, and other species and varieties. Symptoms of the disease are given. Control measures advocated are selection of resistant varieties, good care, and pruning of diseased parts.—Herbert C. Hanson.

1228. BRUNER, STEPHEN C. Sobre la transmisión de la enfermedad del "mosaico" o "rayas amarillas" en la caña de azúcar. [Transmission of sugar cane "mosaic." ] *Rev. Agric. Com. y Trab. [Cuba]* 5: 11-22. *Fig.* 1-5. 1922.—The studies of E. G. Smyth and of E. W. Brandes proving that the disease is transmitted by insects are discussed, and experiments to determine the possible role of the following insects in the transmission of the disease are recorded: *Kolla herbida* Walk. (*Tettigonia similis* Walk.), *Tettigonia* sp., *Draeculacephala mollipes* Say., *D. reticulata* Sign., *Myndus crudus* Van D., *Stenocranus* (Delfax) *Saccharivorus* Westw., *Phaciocephalus* sp., *Oliarus* sp., *Monecphora bicincta* Say., *Pseudococcus calceolariae* Mask., *Pseudococcus sacchari* Ckl., *Aphis maydis* Fitch., *Sipha maydis* Pass., *Thrips*, *Tarsonemus spinipes* Hirst., *Paratetranychus viridis* Banks., *Euscelis bicolor* Van D., *Liburnia* sp., and *Aphis setariae*. Positive transmission of the disease was attributed only to *Aphis maydis* Fitch, in which case, however, only a low percentage of infections was obtained. Artificial

inoculation and transmission of the disease were effected by mechanical means, the disease appearing in 18 days. Various methods of artificial inoculation are discussed. Literature is cited.—*G. R. Hoerner.*

1229. BURLISON, W. L., AND R. W. STARK. Treating oats for smut. Illinois Agric. Exp. Sta. Circ. 240. 4 p. 1920.—Results are reported on the yield of oats (*Avena sativa*) and the percentage of smut (*Ustilago Avena*) present where seed was treated with varying quantities of formalin solution. During this experiment, which was conducted for 5 years, 1 pint of 40 per cent formaldehyde mixed with 10 gallons of water and used at the rate of 1 pint of solution per bushel of oats, gave satisfactory results.—*O. H. Sears.*

1230. DASTUR, J. F. Die-back of chillies (*Capsicum* spp.) in Bihar. Mem. Dept. Agric. India Bot. Ser. 11: 129-144. 2 pl. 1921.—The most serious disease of chillies (*Capsicum annuum* and *C. frutescens*) in Bihar is the die-back disease, which does considerable damage in September and October in years of continuous rain or high humidity. It spreads rapidly from field to field and in severe cases the plants are either completely killed or so badly affected that the yield is negligible. Cold weather checks the disease, the plants recovering and putting out healthy new growth. The disease is caused by a fungus, *Vermicularia Capsici* Syd., which infects the growing point or the flower bud most readily if the humidity is above 85. Control measures carried out in 1917 show that Burgundy mixture is useful in checking the disease.—*A. Howard.*

1231. DOIDGE, E. M. Wart disease of potatoes: *Synchytrium endobioticum*. Perc. Jour. Dept. Agric. Union South Africa 4: 447-451. Pl. 1-3. 1922.—The author describes this disease, which has been discovered for the 1st time in South Africa in the Impendhle Division, Natal. No substance experimentally applied to the soil has proved a remedy for wart. It is carried from place to place by infected seed and is spread locally by lack of care in the use of tools and chiefly by feeding diseased material to animals. Since 1919, 11 early varieties, 21 2nd early, and 31 main crop varieties have been confirmed as immune to the disease and by order of the Agricultural Board only these may be planted in infected areas in England.—*L. Goldblatt.*

1232. DOWSON, W. J. On the symptoms of wilting of Michaelmas daisies produced by a toxin secreted by a *Cephalosporium*. Trans. British Mycol. Soc. 7: 283-286. 1922.—The outward symptoms of the common wilt disease of Michaelmas daisies are, first a mottling of the leaves with pale patches, then a paling of the entire leaf, and finally a yellowing, shriveling, and drying of the leaf. The experiments described in this paper indicate that the mottling is due to a toxin secreted by the fungus, which causes the chloroplasts to migrate toward the ends of the palisade cells and gradually to disintegrate. The final bright yellow color of the leaves is due to the yellow masses of disintegrated chloroplasts in the ends of the palisade cells.—*W. B. McDougall.*

1233. DUFRENOY, JEAN. The occurrence of *Cronartium ribicola* in Europe. Phytopathology 12: 302-304. 1922.—*Cronartium ribicola* occurs to some extent all over Europe north of the Alps. Though frequently found in France, it is not generally considered a menace in the government forests where proper sanitation is practiced.—*B. B. Higgins.*

1234. EASTHAM, J. W. Black currant rust. Ann. Rept. British Columbia Fruit Growers Assoc. 32: 42-43. 1921.—A brief discussion is given of the economic importance of the discovery of *Cronartium ribicola* in the province and of the fruit growers' interests and responsibilities in the situation.—*J. W. Eastham.*

1235. EASTHAM, J. W. White-pine blister-rust in B. C. Agric. Journ. British Columbia 7: 29, 41, 57, 64. 1922.—This is a popular article dealing with the probable consequences of the extensive discovery of blister rust on cultivated *Ribes* in the Coast region of British Colum-



bia in the fall of 1921. Attention is drawn to the quarantine placed on this area, and the reasons for it are discussed.—*J. W. Eastham.*

1236. ELLIOTT, JOHN A. The Ascochyta blight of cotton. [Abstract.] *Phytopathology* 12: 250. 1922.

1237. FOËX, ETIENNE. Le *Schizophyllum commune* stipité. [Stiped *Schizophyllum commune*.] *Bull. Soc. Path. Vég. France* 9: 151-152. *Pl. 1.* 1922.—*Schizophyllum commune*, growing at first on acorns or chestnuts buried several centimeters under ground, forms a stipe which elongates so that the sporiferous receptacle may reach the light. However, the stipe which has thus begun to form on the buried acorn continues to elongate even after the acorn has been dug up and the fungus in consequence is exposed to the light.—*J. Dufrenoy.*

1238. HUNGERFORD, CHAS. W. The relation of soil moisture and soil temperature to bunt infection in wheat. *Phytopathology* 12: 337-352. *Fig. 1-5.* 1922.—For some years it has been known that in the Palouse region of Idaho and Washington spores of *Tilletia Tritici* (Bjerk.) Wint., blown from threshing machines, infect the fallow soil and the succeeding crop of wheat. Recent investigations have shown that such soil infestation also occurs in other wheat-growing regions of the Pacific Coast. Field observations and field and greenhouse experiments have shown that soil temperature and soil moisture at the time of seeding are important factors in seedling infection. Under controlled conditions in the greenhouse the highest percentage infection was obtained at temperatures of 9-12°C., and in soil containing 22 per cent moisture with a moisture equivalent of 20.7. It was also observed that bunt infection in the field was much more abundant when the grain was sown just after a rain.—*B. B. Higgins.*

1239. KULKARNI, G. S. Conditions influencing the distribution of grain smut (*Sphacelotheca Sorghi*) of jowar (*Sorghum*) in India. *Agric. Jour. India* 17: 159-162. 1922.—The spores of the fungus germinate best between 20 and 23°C. Above 37°C. very few germinate and 40°C. prevents germination altogether. The seeds of jowar, on the other hand, germinate most rapidly at 36-40°C. and more slowly as the temperature falls. As infection takes place in the seedling stage, there is likely to be a direct connection between the amount of infection and the temperature at sowing time. This was confirmed by direct experiments carried out at Poona, Pusa, and in Sind.—*A. Howard.*

1240. LACHAINE, O. W. Sclerotial disease of the potato. *Quebec Soc. Protection Plants Ann. Rept.* 14: 105-109. *Fig. 1-6.* 1922.—During 1921 in Restigouche County, Province of New Brunswick, a 4-acre field of potatoes was affected to the extent of 10 per cent, and 4 others from 1 to 2 per cent, with a wilt and stalk rot due to *Sclerotinia libertiana*.—*B. T. Dickson.*

1241. LÖHNIS, M. P. Onderzoek over *Phytophthora infestans* (Mont.) de By. op de aardappelplant. [Investigation of *Phytophthora infestans* on potato.] [English summary.] *Diss. Veenman: Wageningen, Holland, 1922.*—Plants (158) from infected tubers did not show infection in the field earlier than those from healthy seed. Sixty-seven infected tubers kept sprouting at 25-27°C. gave no diseased sprouts, while 240 sound tubers grown on ground that had never been in potatoes before showed blight on the same day as plants in other fields. Infection of the sprout from a diseased tuber is not the normal method of propagation from season to season.—Tubers may show the disease before the leaves are blighted.—The stage of development has no influence on the chance of contagion through neighboring plants.—In summer the fungus can not enter the tubers through the eyes, and chances of infection through the lenticels appear to be small. Artificial infections through small injuries in the skin are easily accomplished. The usual way of entrance into the tubers is through small injuries.—Of 142 plants in a field, only 1 tuber was inoculated, but infections occurred, though no spreading through the stolons to other tubers was observed.—In determining the length of time after which infection through a wound becomes impossible, it was found that wounds in young tubers

were much sooner immune to inoculation than those of ripe tubers. A correlation was found between the state of ripeness of the cork-cambium and the length of time after which no inoculations succeeded. No correlation exists with the rate of formation of wound-cork or with a distinct stage in its formation. The wound-cork does not appear to be the only factor that protects against infection.—The method of inoculating sterile blocks of raw potatoes in test-tubes in order to determine the degree of resistance of different varieties is not reliable, because blocks showing no outside growth of mycelium may be deeply infected within. The extension in the parenchyma was equal in tubers of 28 varieties. In inoculating young tubers of 39 varieties on the cork-cambium infections succeeded. Only Bravo is apparently highly resistant. Bravo tubers are highly resistant also in the field. No difference in thickness of skin or in the rate of wound-cork formation was found among different varieties. As *Phytophthora* may grow on white bean agar with 60 per cent sucrose, no connection appears to exist between osmotic pressure of the cell-sap and the growth of the fungus.—*J. Westerdijk*.

1242. MAJOR, T. G. An *Alternaria* disease of *Polypodium*. Quebec Soc. Protection Plants Ann. Rept. 14: 59-61. 1 fig. 1922.—Concentrically-zonated, brown lesions, generally occurring at the margins of fronds, were caused by an *Alternaria* with conidia averaging  $13.6 \times 40.3 \mu$  and tentatively named *Alternaria Polypodii* n. sp. The disease was experimentally produced by spraying a spore suspension of this fungus on healthy, sterilized fronds.—*B. T. Dickson*.

1243. MANNS, T. F. Report of fungus diseases for 1920. Delaware State Bd. Agric. Bull. 10. 72-77. 1921.—Apple blotch (*Phyllosticta solitaria*) was severe on some early varieties. Apple scab (*Venturia pomii*) is difficult to control but the delayed dormant spray is helpful. Apple rust (*Gymnosporangium macropus*) was severe in 1 district. Root rot of apple from fire blight was less active in 1920 than in the blight years (1915-1917). Crown gall (*Bacterium tumefaciens*) on apple caused much loss.—Many unsprayed pear orchards were defoliated with leaf blight (*Entomosporium maculatum*), and *Septoria pyricola* was common. Corn root rot was common, causing 10-15 per cent injury.—Root rot of peas caused by *Pythium deBaryanum* is noted. Many cases of "sick soil" due to parasitic fungi are mentioned. Late blight of potatoes (*Phytophthora infestans*) caused 8 per cent of rot in field and storage.—*T. F. Manns*.

1244. MANUEL, H. L. Spraying for black spot of the vine. Agric. Gaz. New South Wales 33: 585-586. 1 fig. 1922.—Two spraying devices lined with lead for use in spraying sulphuric acid solutions are described.—*L. R. Waldron*.

1245. MIÉGE, M. Observations sur quelques maladies des plantes cultivées au Maroc, en 1911. [Observations on the diseases of crop plants in Morocco.] Bull. Soc. Path. Vég. France 9: 102-108. 1922.—Wheat was heavily rusted by *Puccinia glumarum* in 1921, *Triticum aurum*, *T. turgidum*, and *T. monococcum* suffering as much as *T. vulgare*. *Phytophthora infestans* infects potatoes at any time of the year, even those which are cropped at the beginning of June. *Plasmopara viticola* spreads as the vine culture extends. The occurrence of several other fungus diseases is noted.—*J. Dufrenoy*.

1246. MITRA, MANORANJAM. Morphology and parasitism of *Acrothecium Penniseti* n. sp. (a new disease of *Pennisetum typhoideum*). Mem. Dept. Agric. India Bot. Ser. 11: 57-74. Pl. 1-4 (pl. 1, col.), 1 fig. 1921.—This new disease was found on bajra (*Pennisetum typhoideum*) a crop which takes 4th place among Indian cereals, with an area of 13,320,000 acres. The ears, leaves, and leaf sheaths are attacked, with the formation of brown spots with yellow margin. The cause of the disease is a new species of fungus (*Acrothecium Penniseti*) which infects the host by way of the stomata, or by piercing the epidermis. The mycelium is both intra- and inter-cellular and is found in all parts of the infected plant. Conidiophores arise in clusters through the stomata and spores are borne apically in fascicles of 2-5. The fungus is cultivable on most artificial media but gives the highest development on wheat broth agar, potato juice



agar, nutrient glucose agar, and on French bean agar; the reaction is between + 5 and + 10 of Fuller's scale. Conidia and brown chlamydospores are both produced in culture. The parasitism of the fungus has been proved by numerous inoculations on leaves and ears. Cross inoculations on the male inflorescence of maize were successful, but those on *Sorghum* gave negative results.—A. Howard.

1247. NOWELL, W. A root disease of cacao in Trinidad. Bull. Dept. Agric. Trinidad and Tobago. 184: 178-199. 3 pl. 1919.—The writer discusses Rosellinia diseases with special attention to that of the cacao due to *Rosellinia Pepo*, though another species is believed to attack cacao in certain localities. The fungus and the appearance of diseased trees are described. The fungus attacks both bark and wood and in cacao plantations the original infection may be traced to forest stumps left to decay, subsequent infection spreading from tree to tree. All infected trees should be burned and all roots destroyed; the roots of adjacent trees should be isolated by trenches and the soil aerated and limed. Sulphur is also recommended as a fungicide, but to prevent increased acidity it should be accompanied or followed by lime.—Florence A. McCormick.

1248. PUTTERILL, V. A. Pear scab in the Western Province: experiments and facts relating to its control. Union South Africa Dept. Agric. Bull. 1922<sup>2</sup>: 31 p., 12 pl., 4 fig. 1922.—An account is given of certain spraying experiments to control pear scab (*Venturia pirina* Aderh.) and on its occurrence in South Africa. The experiments of 1920-1921, though negative with regard to scab control, were of value in proving the necessity of controlling primary leaf infection. Those of 1921-1922 resulted in a control of leaf infection by the use of either Bordeaux mixture or of lime sulphur. The amount of diseased fruit varied from 2 per cent in sprayed trees to 59 per cent in unsprayed trees. Six sprayings were found necessary, the 4th to 6th applications being combined with arsenate of lead for the control of codling moth. The perithecial stage was found and some observations were made on the discharge of the ascospores.—E. M. Doidge.

1249. PUTTERILL, V. A. Plant diseases in the Western Province IV. Two diseases of the loquat. Jour. Dept. Agric. Union South Africa 4: 332-337. Fig. 1-7. 1922.—A description is given of the diseased fruit and leaves of the loquat (*Eriobotrya japonica*) attacked by *Fusicladium* or scab and by *Entomosporium* blight. Suggestions are offered for the control of these diseases. A common leaf blight of quince and pear doing much damage in South Africa is caused by a similar if not identical *Entomosporium*. A winter stage of this fungus (*Fabraea maculata* Atk.) is known to occur on old fallen leaves. So far as the author knows this stage has not been found on the loquat.—L. Goldblatt.

1250. PUTTERILL, V. A. Plant diseases in the Western Provinces V. The control of pear scab or "*Fusicladium*." Jour. Dept. Agric. Union South Africa 4: 430-431. Fig. 1-2. 1922.—This disease may be kept in check by spraying with Bordeaux mixture or lime sulphur at certain times. The writer mentions the discovery last September, of the winter or perithecial stage of the fungus for the 1st time in South Africa.—L. Goldblatt.

1251. RATHBUN, ANNIE E. Root rot of pine seedlings. Phytopathology 12: 213-220. Fig. 1. 1922.—In an attempt to determine the relation of various soil inhabiting fungi to root rot of coniferous seedlings, a number of inoculations were made on 4-6 months old seedlings of *Pinus resinosa* Ait. and *P. banksiana* Lamb. with cultures of *Pythium deBaryanum* Hesse, *Corticium vagum* B. & C., *Phomopsis juniperovora* Hahn, *Rheosporangium aphanidermatus* Edson, *Fusarium* spp., and *Botrytis* spp. The fungi were grown upon rice mush. A fragment of this medium containing the fungus was placed in contact with the roots of the seedlings. After 10 days the condition of the root system of each plant was recorded. Some rot occurred on the roots of non-inoculated check plants; but it was decidedly more severe on plants inoculated with *Corticium vagum*. All of the fungi used caused some increase in the amount of root rot.—B. B. Higgins.

1252. REED, GEORGE M., AND GEORGE H. DUNGAN. **Flag smut and take all.** Illinois Agric. Exp. Sta. Circ. 242. 4 p., 1 fig. 1920.—The appearance and control of flag smut (*Urocystis Tritici*) are discussed. Varieties resistant to this disease are recommended. Control of take-all (*Ophiobolus graminis*) lies in selecting the less susceptible varieties for seed.—O. H. Sears.

1253. RIDLER, W. F. F. **The fungus present in Pellia epiphylla (L.) Corda.** Ann. Botany 36: 193-207. Fig. 1-8. 1922.—A fungus is described which was found to occur in the thallus cells of *Pellia epiphylla*. Infection was found in all plants examined. These were collected in England and Belgium. In some cases the fungus was found in the cells of the sporophyte, pycnidia being produced in the capsule wall, calyptra, and involucre. The fungus was isolated and grown in pure culture and identified as a species of *Phoma*. The author was not able to reinoculate with the cultured fungus as no *Pellia* without the fungus has been found. Usually the diseased host was able to grow and reproduce in a normal manner. A review of the work of various authors on Musci infected by fungal mycelia is given.—W. P. Fraser.

1254. RIVIER, A. **Observations sur le Sclerotinia libertiana Fuck.** [On *S. libertiana*.] Bull. Soc. Path. Vég. France 9: 134-137. 1922.—Sclerotia of *Sclerotinia libertiana* were found on shoots of *Pyrethrum cineraraefolium* growing in wet ground near lettuce and cantaloupes. The fungus was successfully inoculated from diseased lettuce and cantaloupes to *Pyrethrum*, which had not been reported hitherto as host to this fungus.—J. Dufrenoy.

1255. ROBERTS, J. W. **Apple scab and other diseases.** Rept. Maryland Agric. Soc. 6: 168-175. 1921 [1922].—The control of apple scab in Maryland can be accomplished largely by proper sanitary measures in plowing under the fallen leaves. The Winesap, Stayman, and Delicious varieties are rather susceptible to scab whereas York Imperial is nearly immune. Peach leaf curl, pear spot, and cherry leaf spot have caused severe damage in Maryland, but can be controlled by proper spraying.—A. Lee Schrader.

1256. RORER, JAMES BIRCH. **The fungous diseases of the avocado.** Bull. Dept. Agric. Trinidad and Tobago 18: 132-133. 2 pl. 1919.—Anthracnose is given as the only serious disease of avocado. The fungus is identical with, or very closely related to, the anthracnose of the mango (*Gloeosporium mangiferae*) described in Bull. Dept. Agric. Trinidad and Tobago 14: 164. 1915.—A description of the trouble is given and spraying with Bordeaux mixture is recommended. *Diplodia cacaicola* causes die-back of avocados as well as of cacao and rubber. It has not been proved that the fungus is able to penetrate uninjured shoots but it is thought probable that it gains entrance into very young tissues through wounds made by the anthracnose fungus. Bordeaux mixture is recommended for this disease.—Florence A. McCormick.

1257. RORER, JAMES BIRCH. **The fungous diseases of roses and their treatment.** Bull. Dept. Agric. Trinidad and Tobago 18: 29-31. 1 pl. 1919.—The following diseases are briefly described: black spot, caused by *Diplocarpon Rosae* Wolf (*Actinonema Rosae*); leaf spot, due to *Cercospora rosicola* Pass.; powdery mildew, caused by *Sphaerotheca pannosa* Lév.; red rust, due to the parasitic alga *Cephaleuros virescens*; and rose canker, caused by a species of *Stilbum*. For the first 3 troubles flowers of sulphur passing a 200-mesh sieve, and dry arsenate of lead,—1 pound to 9 of sulphur and thoroughly mixed,—are recommended. For the other 2 diseases cutting back and burning of the diseased stems is recommended and for the red rust spraying with Bordeaux is also advised.—Florence A. McCormick.

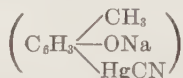
1258. RORER, JAMES BIRCH. **The wither-tip of limes.** Bull. Dept. Agric. Trinidad and Tobago 18: 1-3. 1 pl. 1919. [with notes added by W. G. FREEMAN].—A severe outbreak of wither-tip of limes, due to *Gloeosporium limetticolum* Clausen, is reported for July and August, 1918. The fungus attacks the tips and edges of very young leaves, the base of the stalk, or any point in the very young shoots. The first symptom is a somewhat water-soaked appearance of the attacked parts which later become brown and wither. Flowers and young fruits



are also susceptible. Infected flowers fall and diseased fruits show a rough scabby appearance and become cracked. During the dry season all dead wood and diseased leaves should be burned and as soon as the trees begin to make their new growth they should be sprayed with 4-4-50 Bordeaux mixture, to which has been added a sticker.—*Florence A. McCormick.*

1259. SANDERSON, A. R. On the parasitic habits of the plasmodium of *Physarum viride* var. *rigidum* Lister. Trans. British Mycol. Soc. 7: 299-300. 1922.—The plasmodium grows commonly in southern Malaya as a parasite on *Schizophyllum commune* on decaying logs of *Hevea brasiliensis*. Experiments showed that it can also grow as a parasite on *Hirneola hispida*.—*W. B. McDougall.*

1260. SCHAFFNIT, E. Zur Bekämpfung der Pilzkrankheiten des Getreidekorns. [Control of fungus diseases of grains.] Landw. Jahrb. 57: 259-283. 1922.—Copper sulphate and formaldehyde are commonly used for treating seed grain, especially wheat seed, for fungus spores (rust). When the concentration or time of action of these two active chemicals is not properly controlled, however, the embryos may be injured, in consequence of which the germination and growth are affected. But even if technical errors in the use of the chemicals are eliminated, the seed grain itself varies in sensitiveness due to varying degrees of ripeness of seed, injury in process of threshing, etc. A number of preparations were compared as to their disinfecting power. The most active of these were found to be Germisan



and Uspulun (a chlorphenol-mercury compound), the former being more active but having a somewhat retarding effect on seed germination. The following factors are also considered as bearing upon the causes of infection: (1) temperature of germination, (2) chemical condition of soil (lack or abundance of nutrients), (3) physical condition of soil (moisture content, soil structure), (4) change in life energy of seedlings (rapidity of growth of specific varieties, quality of seed).—*Selman A. Waksman.*

1261. SHAPOVALOV, M. *Rhizoctonia Solani* as a potato-tuber rot fungus. Phytopathology 12: 334-336. Pl. 23. 1922.—*Rhizoctonia Solani* Kühn has been found causing a jelly-like decay of the stem ends and knobs of potato tubers, principally of the Burbank and the Netted Gem varieties. In these varieties the elongated stem ends were found to be abnormal. The flesh was watery and translucent in appearance, and deficient in starch. A typical jelly-like rot was produced when such stem ends of disinfected tubers were inoculated with *Rhizoctonia*.—*B. B. Higgins.*

1262. SHARPLES, A. Treatment of mouldy rot disease by application of "agrisol." Agric. Bull. Federated Malay States 9: 184-191. 1921.—An account is given of a measure of success with this proprietary coal tar disinfectant against the mouldy rot disease of *Hevea brasiliensis*.—*I. H. Burkill.*

1263. SHAW, F. J. F. Studies in diseases of the jute plant. I. *Diplodia Corchori* Syd. Mem. Dept. Agric. India Bot. Ser. 11: 37-56. Pl. 1-11 (pl. 1, col). 1921.—The black band disease of jute (*Corchorus capsularis*) occurs towards the end of the season on the stems of the early sown crop raised for seed, and is widely diffused over the whole tract where this crop is cultivated in Bihar, Assam, and Bengal. The disease is caused by *Diplodia Corchori* Syd. which attacks the stems after flowering, the amount of infection varying greatly from season to season. The fungus is most severe on large, well-grown stems and infection takes place more readily upon green-stemmed than upon red-stemmed varieties. Further research is needed to ascertain the precise mode of infection, the limits of humidity and temperature under which infection takes place, and the reason why the late sown crop is resistant. Direct remedial measures are considered to be scarcely possible. The effective control of the disease must be

sought by means of increased knowledge of the factors involved in the growth of the host and the parasite. The fiber crop is generally free from the fungus.—A. Howard.

1264. SHERBAKOFF, C. D. *Fusaria* of corn. [Abstract.] *Phytopathology* 12: 251. 1922.

1265. SNAPP, OLIVER I. Dusting vs. spraying for the control of the curculio, brown rot and scab of peaches. [Abstract.] *Phytopathology* 12: 250-251. 1922.

1266. SPAULDING, PERLEY. Viability of telia of *Cronartium ribicola* in early winter. *Phytopathology* 12: 221-224. 1922.—Germination tests were made with teliospores of *C. ribicola* from leaves of *Ribes nigrum*, *R. odoratum*, *R. americanum*, *R. rotundifolium*, and *R. cynosbati*. The tests were made at Bethel, Vermont, beginning Sept. 26 and continuing until Dec. 8. Vigorous, living leaves bearing telia were collected from various localities. The viability of the spores was tested by placing the leaves bearing them in moist chambers and then, after a time, estimating the percentage germinated. Other telia-bearing leaves, both living and dead, were collected at various times during the period of the tests. Teliospores on leaves of *R. nigrum* germinated vigorously at the last test, Dec. 8. Strong germination was also obtained with spores on the leaves of *R. americanum* and *R. cynosbati*. On leaves of *R. cynosbati* which had fallen on the snow, teliospores had germinated Dec. 3. The results indicate that infection of pines may continue indefinitely into the winter under New England conditions.—B. B. Higgins.

1267. STOUTAMIRE, RALPH. Cause of melanose and kindred disease, stem-end rot. *Florida Grower* 26: 6. 5 fig. 1922.—Melanose (*Phomopsis Citri*) on citrus is widely distributed throughout Florida. Bordeaux mixture (3-3-50) is probably the best spray. A new spray mixture, Bordeaux oil, has given splendid results; it seems to serve the double purpose of preventing melanose and stem-end rot, and scab.—J. C. Th. Uphof.

1268. TAUBENHAUS, J. J. Recent studies of Texas root rot of cotton. [Abstract.] *Phytopathology* 12: 250. 1922.

1269. TAYLOR, MINNIE W. Potential sporidia production per unit in *Cronartium ribicola*. *Phytopathology* 12: 298-300. Fig. 1. 1922.—The telial columns were counted on 68 leaves from the following species of *Ribes*: *R. americanum*, *R. cynosbati*, *R. glandulosum*, *R. lacustre*, *R. nigrum*, *R. odoratum*, *R. oxycanthoides*, *R. rotundifolium*, *R. setosum*, *R. triste*, and *R. vulgare*. The number of teliospores per column were then estimated and the number multiplied by the number of columns per leaf. Four times this product gave the maximum number of sporidia that could be produced per leaf. The comparisons were made on the basis of the potential sporidia per unit of leaf area. These comparisons indicate that the cultivated *R. nigrum* is by far the most dangerous neighbor to the pine trees.—B. B. Higgins.

1270. TOCHINAI, YOSHIHIKO. Studies on the physiology of *Fusarium Lini*. *Trans. Sapporo Nat. Hist. Soc.* 8: [14-19.] 1921.—*Fusarium* wilt of flax was first discovered in Japan by K. Miyabe in 1892. The disease is an important problem in Japan and in America. In Europe the centuries-old practice of crop rotation has reduced its ravages.—The fungus develops well and produces conidia on a variety of artificial media, and chlamydospores are formed in old cultures. In the synthetic medium used (ammonium nitrate, 10 gm.; potassium bisulphate, 5 gm.; magnesium sulphate crystals 2.5 gm.; cane sugar, 50 gm.; iron chloride, a trace; distilled water, 1000 cc.) tannic acid and citric acid retarded growth. In potato agar medium a low concentration of citric acid stimulated, while a high percentage retarded growth. In the synthetic solution the minimum, optimum, and maximum temperatures for growth are, respectively, 10-12, 30, and 36-37°C. Conidia do not germinate after 2 hours wet heat at 50°C. Wet heat of 60°C. does not kill the chlamydospores within 3 hours. The vitality of the fungus is not injured by -21°C.—Frederick V. Rand.



1271. VINCENS, F. *Maladies des jeunes plants et champignons microscopiques nouveaux observés sur Cinchona en Indochine.* [Seedling diseases and microscopic fungi on *Cinchona* in Indochina.] Bull. Soc. Path. Vég. France 9: 125-133. Fig. 1-4. 1922.—*Cinchona succirubra*, *C. ledgeriana*, and the hybrid *C. succirubra* × *C. ledgeriana* were diseased in nurseries at Honba, 4,500 feet above the sea in a very misty region of Indochina. The leaves of seedlings, chiefly those of *C. ledgeriana*, were spotted and fell early. Three species of *Phyllosticta* (*P. honbaensis* n. sp., *P. cinchonaecola* n. sp., and *P. Yersini* n. sp.), *Phlyctaena Cinchonae* n. sp., and *Phoma Cinchonae* n. sp. were found on fallen leaves, and are described. *Dendrophoma Cinchonae* n. sp., *Physalospora Cinchonae* n. sp., and *Guignardia Yersini* n. sp. occur on the cortex of diseased seedlings. Spraying with copper mixtures proved to be most dangerous to *Cinchona* seedlings, and the nursery had to be removed to a neighboring place.—J. Dufrenoy.

1272. WHITE, E. W. Apple tree anthracnose or black-spot canker control. Sci. Agric. 2: 186-191. Fig. 1-3. 1922.—The author recommends spraying early varieties with 3-4-40 Bordeaux mixture before the fall rains; spraying King and Jonathan in late August with 1-1½-40 Burgundy mixture, and when the fruit is picked with 3-4-40 Bordeaux mixture; and spraying late varieties with 3-4-40 Bordeaux mixture in August.—B. T. Dickson

1273. WILLAMAN, J. J., AND W. M. SANDSTROM. Biochemistry of plant diseases III. Effect of *Sclerotinia cinerea* on plums. Bot. Gaz. 73: 287-307. Fig. 1-7. 1922.—This is the 3rd paper in a series dealing with the biochemistry of the brown rot organism of stone fruits. The 1st dealt with its vitamine requirement, the 2nd with its relations to pectic compounds, and the present one with the changes which it produces in certain varieties of plums during the process of rotting. Five varieties of plums were used, 3 of which showed marked resistance to brown rot and 2 of which were very susceptible. Samples were taken (1) of half grown plums, (2) of plums just beginning to ripen, and (3) of fully ripe ones. Each sample was divided into 3 portions, one of which was analyzed immediately, another placed in a moist chamber and inoculated by injecting spores into the tissues, and the last left uninoculated in a moist chamber. The susceptible varieties showed a greater amount of sporulation on the surface of the fruits than the resistant ones; also, the juices of the former had a lower specific gravity, a lesser H-ion concentration, a higher titrable acidity, and a slightly smaller oxalic acid content. During the process of rotting the fungus causes a decrease in specific gravity, in H-ion concentration, and in titrable acid, but an increase in oxalic acid content. In addition it converts non-protein nitrogen of the host into protein nitrogen in its own vegetative parts and prevents the production of tannin as occurs in green fruits after picking.—F. A. Wolf.

#### DISEASES CAUSED BY BACTERIA

1274. ANONYMOUS. Melon canker. Exp. and Res. Sta. Nursery and Market Garden Industries'—Development Soc. Ltd.,—Turner's Hill, Cheshunt, Herts Ann. Rept. 7: 40. 1921.—A bacillus which is capable of producing this disease of melons (*Cucumis*) has been isolated from the cankers which appear on the plants at the ground line about the time the first fruits are set. Control measures consist of dusting diseased parts and adjacent soil with 2 parts by weight of powdered copper sulphate, 2 parts flowers of sulphur, and 10 parts dry slaked lime. Watering with Cheshunt Compound is also beneficial.—W. H. Tisdale.

1275. ANONYMOUS. Soft rot of the Arum. Exp. and Res. Sta. Nursery and Market Garden Industries'—Development Soc. Ltd.,—Turner's Hill, Cheshunt, Herts Ann. Rept., 7: 39-40. 1921.—The Arum or Calla Lily (*Richardia*) is subject to a severe disease which at one time threatened to exterminate the crop. The disease is of a bacterial nature and is chiefly the result of a soft rot-producing organism, *Bacillus aroideae*. The disease is controlled satisfactorily by removing the diseased tissues from the corms, washing them thoroughly and steeping in 2 per cent formaldehyde for 4 hours. Clean soil and clean water should be used.—W. H. Tisdale.

1276. BROWN, D. D. Treatment of tobacco seed against wildfire and angular spot in southern Rhodesia. Rhodesia Agric. Jour. 19: 205-208. 1922.—The treatment of tobacco seed with a solution made up of 29.5 cc. of 40 per cent formaldehyde and 473 cc. of water is found to minimize the damage done to the tobacco crop by wildfire and angular spot caused respectively by *Bacterium tabacum* and *Bacterium angulatum*.—L. J. Goldblatt.

1277. DUFRÉNOY, J. Tumeurs de Sequoia sempervirens. [Tumors of Sequoia sempervirens.] Bull. Soc. Path. Vég. France 9: 148-150. Fig. 1-3. 1922.—Tumors may develop on wounded twigs, probably through infection. Transverse sections show polystelic structure, several vascular strands being imbedded in the hyperplased cortex-parenchyma, many cells of which are giant, multinuclear cells. Bacteria were observed in the parenchymatous cells.—J. Dufrénoy.

1278. EATON, B. J. Chemical notes. Malay. Agric. Jour. 10: 18-19. 1922.—Pink spot caused by *Bacillus prodigiosus* appears on the scrap rubber from *Hevea brasiliensis* on the day after it is brought into the factory.—I. H. Burkill.

1279. FROMME, F. D., AND S. A. WINGARD. Blackfire and wildfire of tobacco and their control. Virginia Agric. Exp. Sta. Bull. 228. 19 p., 2 pl. (col.), 9 fig. 1922.—This is a non-technical presentation of data covering 5 years' research which is recorded in detail in Virginia Agric. Exp. Sta. Tech. Bull. 25. Blackfire (*Bacterium angulatum*), which is also known as angular-leafspot, is more prevalent in Virginia than wildfire (*Bacterium tabacum*); the former was found in 85 per cent of fields in 1920 and the latter in 17 per cent. Reduction in yield caused by the 2 diseases during this year is estimated at 22 million pounds of tobacco. Both diseases occur on the leaves of seedlings in the plant bed as well as on leaves and flower parts of plants in the field, and field losses are determined in a large degree by prevalence of infection in the plant bed. Production of disease-free seedlings is considered the most important factor in control. This may be effected by selection of disease-free seed, disinfection of seed in mercuric chloride solution, disinfection of plant bed cloth or the use of new cloth, isolation of the plant bed and avoidance of disease-bearing material such as tobacco refuse or manure containing it. Satisfactory results have been obtained by a majority of the farmers who have practiced these measures. They should be supplemented by field sanitation, fall plowing of land when tobacco is grown in successive years, or rotation and avoidance of disease-bearing material and transfer of infection from field to field in working the crop.—F. D. Fromme.

1280. GARDNER, MAX W., AND JAMES B. KENDRICK. Tomato bacterial spot and seed disinfection. Indiana [Purdue] Agric. Exp. Sta. Bull. 251: 15 p., 10 fig. 1921.—The chief economic importance of this disease is due to the blackened scab-like spots on the fruit which are very objectionable to canners and market gardeners. No varieties have proved resistant. The bacteria which cause this disease (described elsewhere as *Bacterium exitiosum*, and by Miss E. M. Doidge as *Bacterium vesicatorium*) infect the leaves through the stomata. These bacteria are very resistant to drying, live over winter on the surface of the seed, and cause cotyledon infection at the time of germination. The disease is controlled by seed disinfection in mercuric chloride, 1:3000, for 5 minutes.—Max W. Gardner.

1281. HEDGES, FLORENCE. Bacterial pustule of soy bean. Science 56: 111-112. 1922.—This disease is much like that produced by *Bacterium glycineum* Coerper but differs in early stages. The organism has been named *Bacterium Phaseoli* var. *sojense* n. var. It occurs south of Washington, D. C.—C. J. Lyon.

1282. KILLIAN. Zur Anatomie des Kartoffelschorfes. [On the anatomy of potato scab.] Landw. Jahrb. 54: 267-276. Fig. 58-69. 1919.—The production of superficial and deep scab pustules or their various modifications seems to depend on the ability of the organ to develop protective layers which will exclude the pathogen. The cause for this different behavior of the cells of the infected tuber appears to be vested in the parasite. It is well known that the different Actinomycetes vary in sensitivity to the chemical reaction of the culture media.



It is also evident that the pathological metabolism of infected cells may cause the production of substances which reduce the vitality of the pathogen and permit the formation of protective periderm layers on the part of the host. A slow host response results in the formation of deep scab pustules, while a quick reaction permits only a superficial penetration by the parasite and the consequent development of superficial scab.—*Ernst Artschwager*.

1283. MACINNES, JEAN. The origin of so-called "mildew" injury to paper-maker's felt. *Paper Trade Jour.* 74<sup>14</sup>: 41-42. *Fig. 1-3.* 1922.—No true "mildew" was found but injury to felts was caused by a bacterium close to *Bacillus mesentericus*. The bacteria form spores resistant to drying and high temperatures. The spores are nearly always present in felts and result in injury when moisture and temperature are favorable. Felts stored in a dry place at moderate temperatures are not damaged.—*H. N. Lee*.

1284. McLARTY, H. R. Fire blight. *Ann. Rept. British Columbia Fruit Growers Assoc.* 32: 47-50. 1921.—This is a popular address on the nature and control of fire-blight.—*J. W. Eastham*.

1285. MIÈGE, M. Sur une maladie de la pomme de terre observée au Maroc. A disease of the Irish potato in Morocco.] *Bull. Soc. Path. Vég. France* 9: 109-112. 1922.—The leaflets of potato, blackened toward their tips, later become detached and fall. Black dots appear scattered over the tubers and finally the diseased parts become liquefied and exude a clear liquid. A bacterium, isolated from diseased stalks, has been cultivated in pure culture. The disease appears to be of bacterial nature but preliminary inoculation tests gave conflicting results, possibly due to the presence of numerous aphids on the experimental plants.—*J. Dufrénoy*.

1286. SMITH, ERWIN F. Fasciation and prolepsis due to crown gall. *Phytopathology* 12: 265-270. *Pl. 16-20.* 1922.—A detailed account is given of the development of a fasciated shoot from a previously dormant bud of *Tropaeolum majus* L. after inoculation with *Bacterium tumefaciens* Sm. & T. No tumor tissue was evident on the surface of the fasciated shoot; but when sectioned and stained, proliferated tumor tissue was found in the interior of its base. The rest of the shoot was free from bacterial invasion. These results together with the study of other artificially produced fasciations have led to the suggestion that fasciations in general are due to some disturbance in the embryonic tissue of the growing point pushing apart the elements which develop into more or less separated axes of growth. Therefore, in studying individual cases of fasciation, the parasite or cause of the deformity should be sought at the base of the abnormal portion. In a discussion of prolepsis induced by the development of crown gall tumors the similarity to conditions found in certain plant diseases of obscure origin, such as peach "yellows," is pointed out.—*B. B. Higgins*.

1287. SMITH, CLAYTON O. Pathogenicity of the olive knot organism on hosts related to the olive. *Phytopathology* 12: 271-278. *Pl. 21-22.* 1922.—In order to obtain more definite data on the host range of *Pseudomonas savastanoi* E. F. S., inoculations were made on olive (*Olea europea* L.), *Fraxinus velutina* Torr., *F. floribunda*, *Adelia acuminata* Michx., *Ligustrum ovalifolium* Hassk., *Chionanthus virginica* L., *Osmanthus fragrans* Lour., *O. aquifolium* Sieb., *Thevetia nereifolia* Juss., *Nerium oleander* L., *Coprosma Baueri* Endl., *Carissa grandiflora* DC., *Chrysanthemum frutescens* L., *Elaeagnus angustifolia* L., *Vinca*, lilac, jasmine (probably *Jasminum primulinum* Hensl.) and on several species of *Prunus*. Definite knots were produced on the olive, *Fraxinus velutina*, *F. floribunda*, *Adelia acuminata*, and *Jasminum primulinum*. On *Osmanthus aquifolium* and on *Chionanthus virginica* some hypertrophied tissue developed, but it was in the form of definite cankerous lesions rather than knots similar to those produced on the olive. On all other species the results were either negative or doubtful. The infectiousness of the organism seems to be confined to plants closely related to the olive.—*B. B. Higgins*.

1288. WELLES, COLIN G. **Bacterial plant diseases in the Philippine Islands.** Science 56: 18. 1922.—Tobacco and other solanaceous and non-solanaceous plants are attacked by *Bacterium Solanacearum* E. F. S. "Citrus is attacked by the citrus canker organism, cabbage by *Pseudomonas campestris* (Pamm.) E. F. S., cotton by *P. Malvacearum* E. F. S., and parsley by an organism not previously described." With the exception of citrus canker, all have been introduced.—C. J. Lyon.

1289. WELLES, COLIN G. **Identification of bacteria pathogenic to plants previously reported from the Philippine Islands.** Philippine Jour. Sci. 20: 279-285. 1922.—*Bacterium Solanacearum* E. F. S. on tobacco, *Pseudomonas Phaseoli* E. F. S. on *Phaseolus vulgaris*, and *Bacterium Malvacearum* E. F. S. on cotton are isolated and identified, while *Bacillus nelliae*, the causal organism of parsley wilt in the Philippines, is described as a new species. In the latter disease the bundles are packed with bacteria as in the wilt caused by *Bacterium Solanacearum*, and the whole behavior of parasitized plants is also similar. However, the author's physiological studies showed the organism to be entirely different and its description and cultural characters on various media are briefly given.—E. D. Merrill.

#### DISEASES CAUSED BY ANIMAL PARASITES (INSECTS, NEMAS, PROTOZOANS, ETC.)

1290. KULKARNI, G. S. **The "murda" disease of chilli (Capsicum).** Agric. Jour. India 17: 51-54. Pl. 6-7. 1922.—The disease is caused by mites and is said to be the greatest enemy of the chilli plant in Bombay. Good results were obtained by use of lime-sulphur wash.—A. Howard.

1291. MCCLINTOCK, J. A. **The control of root-knot. A progress report.** [Abstract.] Phytopathology 12: 250. 1922.

1292. WATSON, J. R. **Bunch velvet beans to control root-knot.** Florida Agric. Exp. Sta. Bull. 163. p. 53-59, fig. 11-12. 1922.—The method of controlling nematodes has grown out of summer fallow experiments. By fallowing and not allowing a crust to form on the surface of the ground, root-knot nematodes were greatly reduced.—For use in nematode control the bunch velvet bean has 2 advantages over the running beans: it allows constant cultivation, and its growing season is shorter. It is also practically immune to nematodes, which is not true of cowpeas, though the varieties Iron, Brabham, and Victory are highly resistant. Velvet beans should be planted early, after the last spring truck crop. If possible this should take place in May, and never later than June. Truckers are advised to employ this method during summer on land infected with root-knot.—J. C. Th. Uphof.

1293. WOODWORTH, H. E. **Injury to citrus by scale insects in the Philippines.** Philippine Agric. Rev. 14: 435-439. 1921.—From observations made principally in the various plantations of the College of Agriculture at Los Baños, Laguna, it is stated that the degree of primary injury from scale insects is usually directly related to the condition of the plant. Scale insects are most numerous during the dry season (January-July), when they receive the minimum of natural check. Injury at this time is greatly enhanced by the poor resistance of the trees during the dry season. Fungi parasitic on scale insects are most effective from August to January and insect parasites, from July to November. The principal fungus parasites of the scale, and insect parasites, are *Microcera coccophila* Desm., *Aschersonia sclerotoides* P. Henn., and *Coccus viridis* Green, are *Microcera coccophila* Desm., *Aschersonia sclerotoides* P. Henn., and *Coccus viridis* Green. Its most important insect parasites are *Coccophagus* sp. and *Aneristis* sp. *Septobasidium* spp. —Spraying or fumigation is a necessary supplement to these natural checks.—Frederick V. Rand.

#### INFECTIOUS CHLOROSES (MOSAIC AND PEACH YELLOWS GROUPS, ETC.)

1294. ANONYMOUS. **Mosaic disease.** Exp. and Res. Sta. Nursery and Market Garden Industries'—Development Soc. Ltd.,—Turner's Hill, Cheshunt, Herts Ann. Rept. 7: 41. 1921.—Mosaic of tomato (*Lycopersicum esculentum* Mill.) is becoming one of the most important



diseases of the crop. Symptoms of the disease are discussed, and its spread by man and insects. Little is known about the disease.—W. H. Tisdale.

1295. DICKSON, B. T. Studies concerning mosaic diseases. Macdonald Coll. Tech. Bull. 2. 108 p., 8 pl. 1922.—A list of plants suffering from mosaic disease, complete to date of writing, is given. This includes as new, mosaic of *Rubus strigosus*, *Pisum sativum*, *Trifolium hybridum*, *T. incarnatum*, and *Medicago lupulina*. One instance of mosaic of *Medicago sativa* is noted. Symptoms are given, including striping of tobacco stems, mottling of tomato fruit, and speckling of red-purple blooms of sweet pea. Modifications of symptoms due to the temperature, and to the amount and virulence of the inoculum are discussed. Mosaic causes a reduction in set of seed and in germinating power in *Vicia faba*, *Trifolium pratense*, and *Pisum sativum*. Seed inheritance of mosaic occurs in clovers and apparently in Leguminosae generally, but not in raspberry. Studies of the pathological histology in 16 mosaic diseases indicate hypoplasia in lighter green areas, reduction in intercellular spaces and chlorophyll content, and increase in number of trichomes. In darker areas there is hypertrophy,—in severe cases due to hyperplasia,—increase in intercellular space volume and in chlorophyll content, and a reduction in number of trichomes. Degenerate plastids and "feverish" movement of minute bodies in severely affected cells is noted. Theories of etiology are given. The author could not find amoeboid bodies such as described in corn, sugar-cane, and *Hippastrum*. Minute bodies, apparently similar to those described by Ivanowski, were found in diseased *Nicotiana tabacum*. Experiments to determine the effect of colored light indicated that no remedial result occurs. Cross-inoculations were carried out among the clovers *Trifolium repens*, *T. hybridum*, *T. incarnatum*, and *Medicago lupulina*; and *Macrosiphum pisi* Kalt was found to be a carrier of the disease. The symptoms distinguishing raspberry mosaic from curl are given. A bibliography gives 153 references.—B. T. Dickson.

1296. DUGGAR, B. M., AND JOANNE L. KARRER. The sizes of the infective particles in the mosaic disease of tobacco. Ann. Missouri Bot. Gard. 8: 343-356. 1921.—Too frequently our knowledge of the infective agency causing mosaic has been chiefly the assertion "of the passage of infective particles through some bacteriological filter, \* \* \* with no particular effort to effect a more precise standardization" of the filters "so as to permit a more definite measurement of the particles concerned." The technique of experimentation has been divided into 3 phases: "(1) filtration of diseased juice through various ultra filters, (2) inoculation of healthy plants with the filtrates obtained, and (3) the standardization of the filters by a determination of their capacity to permit or prevent the passage of colloidal particles of known, or approximately known, sizes."—Preliminary tests were carried out by inoculation with filtrates from diseased juices after they had passed through (1) a Livingston atmometer cup, (2) layers of agar, and (3) Schleicher and Shiill parchment shells. Then such ultra filters as the following were utilized and standardized for size of the particles allowed to pass: (1) the Mandler diatomaceous filter, (2) spherical and cylindrical atmometer cups, (3) atmometer cups infiltrated with  $\text{Al}(\text{OH})_3$ , (4) and celloidin cups. It was found in the preliminary tests that the spherical atmometer cups and the parchment shells allowed the passage of the infective agent. A smaller number of infective particles passed through the cylindrical atmometer cup than through the spherical one used. The Mandler filter proved to be rather porous.—In order to standardize the filters as to porosity, organic sols were used. Dextrin solutions, casein in milk free of fat, haemoglobin prepared from ox blood, and gelatin solution were selected as representing a wide range of sizes of particles. The results show that the infective particles are comparable in size to particles of hemoglobin. Assuming that at most haemoglobin particles have an average diameter of  $30\ \mu\mu$  and the average small diameter of bacterial plant pathogens is around  $1000\ \mu\mu$ , we have 30:1000 to express roughly the diameter relations of mosaic disease particles in comparison with bacterial plant pathogens."—S. M. Zeller.

1297. ELMER, O. H. Mosaic cross-inoculation and insect transmission studies. Science 56: 370-372. 1922.—The mosaic diseases of the Cucurbitaceae, Solanaceae, and Leguminaceae are found to be inter-transmissible. Inoculations were made by means of transfer of juice

and by transfer of aphids from mosaic to healthy plants. The mealy bug, *Dactylopus* sp., also proved to be a good carrier of mosaic.—*C. J. Lyon.*

1298. ESMARCH, F. Beiträge zur Anatomie der gesunden und kranken Kartoffelpflanze. I. Anatomie der vegetativen Organe. [Contribution to the anatomy of the normal and diseased potato plant.] Landw. Jahrb. 54: 161-266. Fig. 1-57. 1919.—In the study of the anatomy of "leafroll plants" carried on for a number of years under the direction of Schander, considerable data bearing on the normal anatomy of the potato plant has been accumulated; and since, notwithstanding the pioneer researches of Sorauer and de Vries, there existed many gaps in our knowledge of the potato plant, it was found desirable to publish the fruits of the investigations of the Bromberg Institute, thereby putting our knowledge of the anatomy of the potato plant on a broader and more exact scientific basis. In this work both anatomical structure and ontogenetic development of all the organs are taken into consideration, and since the structure of many of the tissues is involved numerous illustrations have been added to the text. The literature references are very complete and full credit is given to the work of earlier investigators. According to the writer, the phloem of mature plants always becomes necrotic, and consequently regards the phloem necrosis theory of leafroll as obsolete.—*Ernst Artschwager.*

1299. GARDNER, MAX W., AND JAMES B. KENDRICK. Tomato mosaic. Indiana [Purdue] Agric. Exp. Sta. Bull. 261. 24 p., 13 fig. 1922.—A brief review of the literature on tomato mosaic is followed by an account of the nature and outstanding characteristics of the disease, including illustrations of the symptoms. Attention is focused chiefly upon the mode of overwintering of the disease in the related perennial weeds *Physalis subglabrata*, *P. heterophylla*, and *Solanum carolinense*, of which illustrations are included. These weeds are very abundant in the Indiana tomato regions and mosaic occurs very commonly among the weeds wherever tomatoes have been grown. This perennial reservoir of mosaic in the weed flora is increasing annually as new fields are used for tomatoes. As a mosaic control measure the eradication of these weeds in and near greenhouses, plant beds, and tomato fields is recommended.—*Max W. Gardner.*

1300. KASAI, MIKIO. Observations and experiments on the leafroll disease of the Irish-potato in Japan. Ber. Ohara Inst. Landw. Forsch. 2: 47-77. 1921.—The author discovered the disease in Japan in 1919. So serious has it become that growers in some provinces are obliged to import all their seed. The disease, which appears to be spreading, is characterized by rolling, rigidity, and discoloration of the leaves, dwarfing of the plant, discoloration of the tuber, shortness of stolons, persistence of diseased mother tubers, and marked reduction in crop yields. It is transmitted by the seed-tubers rather than through the soil, and may be carried from plant to plant by insects and by transfers of the juices of diseased plants. A bibliography is appended.—*H. S. Reed.*

1301. LEE, H. ATHERTON, AND E. W. KOPKE. Mosaic disease of sugar cane in the Philippines. Philippine Agric. Rev. 14: 418-421. Pl. 12-14 (pl. 12 colored). 1921.—A history and description of the disease are given, together with a discussion of present knowledge regarding it, losses due to its presence, and methods of control. Careful selection of cane points or cuttings and the utilization of resistant varieties are recommended.—*E. D. Merrill.*

1302. MARRE, EUGENE. La dégénérescence de la pomme de terre. Mission d'études en Hollande. [Degeneration in potatoes.] 52 p., 1 fig. Imprimerie Carrère: Rodez. 1921.—A detailed and circumstantial account is given of a French mission to Holland undertaken at the invitation of H. M. Quanjer for a first-hand study of the degeneration diseases of potatoes and the methods of control practiced in that country.—As a result of this survey certain recommendations are drawn up for the development and maintenance of disease-free seed, including (1) a search for healthy plants among different varieties, (2) isolated culture of selected plants, (3) multiplication by culture *en masse*, and (4) multiplication of selected strains and distribution to the growers.—*Frederick V. Rand.*



1303. MATSUMOTO, TAKASHI. Some experiments with Azuki-bean mosaic. *Phytopathology* 12: 295-297. *Fig. 1-2.* 1922.—A typical mosaic disease is reported as occurring on Azuki beans (*Phaseolus radialis* var. *aurea*) in Japan. The diseased plants are more or less dwarfed. Their leaves are mottled with dark green and lighter yellowish areas, and are often somewhat distorted. In the dark green areas the palisade cells are much longer and narrower than in the normal leaf, while in the yellowish areas the corresponding cells are abnormally short and crowded. Similar conditions are also found in the spongy parenchyma. In the dark areas also the chloroplasts are larger and more abundant than in the lighter areas; and starch is more abundant in the dark areas irrespective of the time of day. Field observations indicate that some varieties may be immune to the disease.—*B. B. Higgins.*

1304. NELSON, RAY. Transference of the bean mosaic virus by *Macrosiphum solanifolii*. *Science* 56: 342-344. 1922.—The spread of bean mosaic was observed during 1921 under conditions which strongly suggested transfer by insects. The sudden appearance of the disease in the aphid-infested water cultures of beans growing in the greenhouse indicated even more definitely the mode of dissemination. Definite proof of the transfer of the virus by *Macrosiphum solanifolii* was obtained under controlled conditions, both in the greenhouse and in the field.—*Author's summary.*

1305. OORTWIJN BOTJES, J. Het gebruik van onrijpe aardappelknollen als pootgoed. [The use of unripe potato tubers for seed.] *Cultura* 34: 173-185. 1922.—The author states that theoretically tubers from early harvested plants, which are supposedly healthy, will give a smaller proportion of diseased descendants than tubers from late harvested plants. This is due to the presence of greater numbers of leaf aphids and "cicadas" during late summer and fall, which increases the chances for infection; and to the fact that in case of infection the contagium will not have the time to spread to as large a number of tubers per plant.—A number of examples are cited which seem to prove this hypothesis. A few (1788-1810) are mentioned in which it was apparently proved that plant material from northern regions and high altitudes was free from "curl" on account of freezing of the foliage before ripening of the tubers. Hutchinson at Wye, England, showed in 1912-1913 that "leafcurl" and "blight" in potatoes were very much decreased by the use of early harvested (July-Aug.) seed tubers. The same information came from Australia and many other places. In nearly all cases the yield was greatly increased. The author shows, however, that the number of cases was too small in which accurate account was kept of the diseased condition of parents and descendants. More experiments will have to be made. The author does not claim that disease-free seed potatoes may be obtained in this manner, but he believes that the influence of the so-called "degeneration" diseases can be greatly lessened.—*Peter J. Klaphaak.*

1306. PALM, B. T. De mozaiekziekte van de tabak een chlamydozoonose? [Is the mosaic disease of tobacco a chlamydozoonose?] *Bull. Deli-proef Sta. Medan, Sumatra* 15. 10 p. 1922. [English translation by P. G. WILSON.]—High lights in the history of tobacco mosaic investigation are briefly outlined from the time of Mayer's work in 1886 down to the more recent studies of Allard, Quanjer, and others.—In the author's histological and cytological investigations use was made of Flemming's mixtures, hot sublimate-alcohol, and Zenker's fluid as fixatives, while Heidenhain's haematoxylin, eosin, and Loeffler's methylene blue were employed as stains.—Using Deli tobacco affected with mosaic, it is claimed that both stained and unstained material showed minute granules of varying size, and peculiarly shaped corpuscles which were not present in healthy tobacco. The larger foreign corpuscles lay either in intimate contact with the nucleus or in its vicinity. They were often amoebiform, less frequently round to spherical. The cell nucleus in such cells was frequently hypertrophied and often showed signs of degeneration.—These granules and corpuscles are described in some detail and compared to the so-called "chlamydozoon-strongyloplasmas" in certain human and animal diseases, such as variola, molluscum contagiosum, trachoma, and "Geflügelpocke."—It is the author's opinion that a *Strongyloplasma* species must be considered as the cause of tobacco mosaic although definite proof of such a causative connection is not yet forthcoming.

It is proposed that the organism first discovered by Ivanowski, apparently identical with the author's findings, should be called in honor of this investigator *Strongyloplasma Ivanowskii* n. sp. A more detailed exposition is reserved for a later paper.—*Frederick V. Rand.*

1307. QUANJER, H. M. Een proef over de beteekenis van ziekten en ziekteverspreiding bij de pootgoedverwisseling, genomen door het Instituut voor Phytopathologie in 1920 en 1921. [An experiment on the significance of disease and disease distribution relative to changing of seed potatoes, conducted by the Institute for Phytopathology in 1920-1921.] *Cultura* 34: 135-141. 1922.—The deterioration of potato varieties in one area more than in another is caused mainly by the increase of certain diseases. The variety Paul Krüger shows a tendency toward susceptibility to leaf-roll while the variety Eigenheimer shows a similar tendency toward mosaic. The former was tested in different sections of the Netherlands. In an experiment near Oostwold, potatoes were planted in a beet field; aphids were rare and healthy plants were in the majority. In the plot near Bennekom aphids were observed, and many plants showed signs of disease. Other similar examples are given.—In connection with these experiments various suggestions are given relative to: (1) the disease distributing insects; (2) the kind of inter-crops; and (3) the influence of soil and climate upon insects and plant diseases. These experiments are to be widely continued.—*J. C. Th. Uphof.*

1308. RANKIN, W. H., AND J. F. HOCKEY. Mosaic and leaf curl (yellows) of the cultivated red raspberry. *Phytopathology* 12: 253-264. 1922.—The symptoms of leaf curl are very characteristic and unmistakable. The mid-vein of each leaflet in all new growth develops unequal tensions which cause it to arch upward and the tip of the leaflet to curl downward. A similar tension in the lateral veins often causes the entire margin of the leaflet to roll downward. The intravascular tissue is often "puckered" or "gathered." Leaves formed previous to infection remain normal throughout the season. New canes formed the year after infection has occurred are stunted and show a distinct phloem necrosis. Fruit formed on infected plants is insipid and has very little pulp. In many respects raspberry leaf curl suggests potato leaf roll. The symptoms of mosaic are not so constant or characteristic. On plants that have been diseased 3-4 years the new canes are short and very slender and the leaves are small, yellowish, and more or less mottled. On plants more recently infected these symptoms are less marked. The fruit produced is similar to that produced on plants affected with leaf curl. Both diseases seem to be spread by an aphid (*Aphis rubiphila* Patch). In the climate of St. Catharines, Canada, the spread is rather slow, usually limited to 1-2 adjacent plants each year.—*B. B. Higgins.*

1309. ROSEN, H. R. Corn mosaic in Arkansas. [Abstract.] *Phytopathology* 12: 250. 1922.

1310. ROSEN, H. R. "Mosaic" disease of corn in Arkansas. [Abstract.] *Phytopathology* 12: 252. 1922.

1311. SIMONETTO, MOISES. Como se debe determinar con buena aproximacion el porcentaje de cañas enfermas en un cañaveral infectado con el "mosaico." [How the percentage of diseased canes should be determined with close approximation in a [sugar cane] field infected with mosaic."] *Rev. Agric. Com. y Trab. [Cuba]* 5<sup>3</sup>: 26-27. 6 fig. 1922.

1312. TICE, C. Leaf-roll disease of the Irish potato. *Agric. Jour. British Columbia* 7: 10-11. Fig. 1-2. 1922.—This popular article for the potato grower discusses the geographical distribution, symptoms, cause, transmission, and economic importance of leaf-roll.—*J. W. Eastham.*

1313. TICE, C. Mosaic disease of potatoes. *Agric. Jour. British Columbia* 7: 77, 83. 1 fig. 1922.—This is a popular article for potato growers.—*J. W. Eastham.*



## PARASITIC PHANEROGAMS

1314. FISCHER, C. E. C. Host plants of *Santalum album*. Indian Forest. 48: 113. 1922.—Ten plants not usually recorded are given as hosts.—E. N. Munn.

1315. LUTHRA, JAI CHAND. *Striga* as a root parasite of sugarcane. Agric. Jour. India 16: 519-523. Pl. 24-26. 1921.—Two species of *Striga* (*S. densiflora* Benth. and *S. euphrasioides* Benth.) were found as semi-parasites on sugar cane in the low-lying areas along the River Sutlej in the District of Ludhiana. The haustoria of this parasitic phanerogam are 1-3 mm. in diameter and attached to the roots of cane in large numbers. The haustoria develop suckers which rupture the endodermis and penetrate into the vascular tissue.—A. Howard.

## NON-PARASITIC DISEASES

1316. LUTMAN, B. F. The relation of the water pores and stomata of the potato leaf to the early stages and advance of tipburn. Phytopathology 12: 305-333. Fig. 1-15. 1922.—The tipburn of potato discussed in this paper is distinct from the burn produced by the potato leafhopper. It is entirely physiological in its origin, being brought about by excessive loss of water and the action of sunlight during periods of dry weather and brilliant sunshine; it is most abundant in Vermont about Aug. 10 when but few leafhoppers are present. The potato leaflets are provided with hydathodes, especially numerous near the tip, which open directly into a comparatively large vein running near the margin of the leaflet. During hot dry weather the loss of water from these hydathodes is so rapid that the conducting system of the leaf can not replace it, and the cells of the underlying tissues are plasmolized beyond recovery. This occurs most frequently at the tip of the leaflet where the hydathodes are so abundant. The subsequent advance of tipburn is due partly to plasmolysis of the cells and partly to the destructive action of intense sunlight on the chlorophyll. The severity of tipburn is reduced by spraying the plants with Bordeaux mixture, doubtless because water pores and stomata become clogged by the gelatinous colloids of the spray, with consequent reduction in transpiration.—B. B. Higgins.

## DISEASES OF UNKNOWN CAUSE

1317. LEE, H. ATHERTON, COLIN G. WELLES, AND MARIANO G. MEDALLA. Fiji disease of sugar cane in the Philippines. Philippine Agric. Rev. 14: 413-417. Pl. 9-11. 1921.—This paper gives a general history and description of the disease, losses due to it, and methods of reducing those losses. Careful selection of cane points or cuttings, and the use of resistant or partly resistant varieties are recommended.—E. D. Merrill.

1318. SANDERSON, A. R., AND H. SUTCLIFFE. Brown bast. An investigation into its causes and methods of treatment. 71 p., 26 pl. (3 colored), 8 fig. Rubber Growers' Assoc.: London, 1921.—This investigational report takes up in detail the symptoms of brown bast of rubber tree, the effects of tapping, the distribution of brown bast cortex in affected trees, the incidence of burr formation, and experiments and recommendations relative to treatment.—Among the points brought out are the following: No case of brown bast has been observed in an untapped tree. If the depth of tapping has to be increased in order to obtain latex this disease may be suspected. The constant characteristic of brown bast is the abnormal presence in the latex of meristematic tissue which is almost invariably in the vicinity of latex vessels. The latex in these vessels is usually coagulated. Tapping is considered the prime cause of the disease and any tree subjected to tapping is liable to, although it does not necessarily develop, the disease. An increase in the period between tapping operations tends to reduce the number of cases. Stripping is a cure for brown bast, prevents its spread, and enables the tapping operations to be kept near the base of the tree where the richest reserve of latex is obtained.—Except in cases of deep-seated origin, starch is usually nearly or quite absent in brown bast cortex. Oil globules are frequently present and sometimes in considerable numbers. A brown substance resembling tannin is abundant, sometimes entirely filling many

of the cortex cells. The newly formed tissue arising from abnormal meristematic cells of the cortex sometimes becomes liquefied.—“The time is rapidly approaching when Brown Bast treatment will become part of the ordinary routine work of the estate.”—*Frederick V. Rand.*

### GENERAL AND MISCELLANEOUS PATHOLOGICAL LITERATURE

1319. ANONYMOUS. Plant pathology. The Lancet 203: 85-86. 1922.—A brief discussion is given of the relationship between plant and animal pathology, especially the technique used in these fields by investigators. Closer cooperation in the 2 fields is suggested.—*W. H. Tisdale.*

1320. APPEL. Die Organisation des Pflanzenschutzes im deutschen Reich. [The organization of plant protection in Germany.] Arbeit. Deutsch. Landw. Ges. 314. 119-136. Fig. 1-2. 1921.—The author divides the growth of this work into 3 periods, the present being the 3rd. The organization of the work with main stations, substations, etc., is described in detail. There are 2 figures, in 1 of which the organization is shown as a grape vine with stem representing the “Direktion” and leaves the outlying stations or lines of work. The other figure is a map of Germany showing the locations of the stations.—*A. J. Pieters.*

1321. APPEL. Die wirtschaftliche Bedeutung der Pflanzenkrankheiten und die Mittel zu ihrer Bekämpfung. [The economic significance of plant diseases and means for their control.] Arbeit. Deutsch. Landw. Ges. 314. 101-118. 1921.—The author quotes figures to illustrate the serious economic loss due to plant diseases and insects, and the methods of combating them.—*A. J. Pieters.*

1322. BALL, E. D. Insects as disseminators of plant diseases. II. Systematic relations of carriers. Phytopathology 12: 229-231. 1922.—A survey of previous work indicates that an insect carrying the infectious entity of a plant disease over winter is very likely to be one which passes the winter in the adult stage; and that, in case of specific transmission, it is likely to be a sucking insect and to have a long adult life period.—*B. B. Higgins.*

1323. BECKER, GEO. G. Three years sweet potato certification work in Arkansas. [Abstract.] Phytopathology 12: 252. 1922.

1324. BIRD, MAURICE. Concerning yield deterioration in the older sugar countries. Internat. Sugar Jour. 24: 406-407. 1922.—As consulting chemist in British Guiana, the writer has observed that in many of the old plantations the plant food in the soil is less than is required by the growing cane. The crop is diminished and subject to insect and fungous pests, in particular to root rot (*Marasmius*). Application of artificial manure which supplied the lacking plant food not only increased the crop but freed it from *Marasmius*.—*C. Rumbold.*

1325. BISBY, G. R., E. E. CLAYTON, W. H. MARTIN, J. T. ROSA, JR., and E. A. STOKDYK. The cooperative potato spraying project: Report for 1921. Phytopathology 12: 241-248. 1922.—The report includes data from potato spraying experiments conducted by pathologists in British Columbia, Manitoba, Eastern Canada, Ohio, New Jersey, Missouri, Kansas, Pennsylvania, West Virginia, Kentucky, Indiana, and Arizona. In the states of Kansas and Missouri the value of Bordeaux mixture is questionable. Comparisons of dusting and spraying were made during 1921 in New Jersey, Ohio, and Manitoba; the results indicate the inferiority of dusting.—*B. B. Higgins.*

1326. BLAIR, R. J. The cause and prevention of decay in structural timber. Paper Trade Jour. 73<sup>2</sup>: 51-53. Fig. 1-6. 1921.—A description is given of the causes of decay, especially in mill roofs, and the type of construction necessary to prevent decay.—*H. N. Lee.*

1327. BROWN, J. G. Treatment of seed potatoes for scab and black scurf. Arizona Agric. Exp. Sta. Timely Hints for Farmers 136. 4 p., 1 fig. 1922.—Popular descriptions of the mercuric chloride and formaldehyde treatments are given.—*Herbert C. Hanson.*



1328. BUCHNER, PAUL. *Tier und Pflanze in intrazellulärer Symbiose.* [Animal and plant in intracellular symbiosis.] 462 p. 2 pl., 103 fig. Gebrüder Borntraeger: Berlin, 1921.—This rather exhaustive, largely zoological work is divided into 7 parts dealing with (1) symbiosis of protozoa, sponges, and coelenterates with green algae and yellow algae; (2) symbiosis in worms; (3) in bryozoa, echinoderms, mollusks, and tunicates; (4) intracellular symbiosis in insects; (5) light symbiosis; (6) the errors in symbiosis investigation; and (7) concluding observations.—Of special interest to pathologists are the sections dealing with the presence of bacteria in amoebae and in *Cyclostoma elegans*, the presence of fungi (Chytridiaceae) in certain ascidians, the errors in symbiosis investigation, and general considerations relative to infection relations and the intimacy of symbiosis.—Nineteen pages are devoted to a literature list.—*Frederick V. Rand.*

1329. BUTLER, O., AND T. O. SMITH. *On the use of acetates of copper as fungicides.* *Phytopathology* 12: 279–289. *Fig. 1.* 1922.—The adhesive power and the fungicidal value of neutral and of basic copper acetate have been studied. Decomposition, which increases the adhesiveness of solutions of these salts, is much more rapid with the basic than with the neutral salt. The adhesiveness of both solutions is increased markedly by the addition of gelatin; and it should always be added, especially to the neutral solution. No measurable difference in the toxicity of the 2 was found; therefore, when obtainable, the basic salt is recommended. Either neutral or basic copper acetate might well replace cupra-ammonia as a spray, being cheaper and less injurious to foliage. Directions for preparing the sprays are given.—*B. B. Higgins.*

1330. CAESAR, L. *Insect[s] as disseminators of plant diseases. III. Control problems* *Phytopathology* 12: 231–233. 1922.—The need of further study on the life history of causal organisms and of more definite knowledge as to the host relationships is emphasized. In many cases, such as mosaic diseases, there are doubtless many wild hosts that carry the infection throughout the winter. Better methods of insect control are also needed.—*B. B. Higgins.*

1331. CORY, E. N. *Report of dusting and spraying investigations.* *Rept. Maryland Agric. Soc.* 5: 318–327. 1920 [1921].—This report summarizes the recent results of dusting and spraying, and presents the results of dusting peaches, strawberries, and truck crops in Maryland. Dusting with 60 per cent sulphur—40 per cent lime controlled the peach lecanium (*Lecanium nigrofasciatum* Perg.). Dusting of strawberries proved successful, and dusting of truck crops offers great promise.—*A. Lee Schrader.*

1332. DICKSON, B. T. *Diseases of the potato.* *Sci. Agric.* 2: 202–206. *Fig. 10.* 1922.—This paper (one of a series) deals with potato canker, leak, and late blight.—*B. T. Dickson.*

1333. DICKSON, B. T. *Diseases of the potato.* *Sci. Agric.* 2: 234–236. 1922.—Sclerotinia wilt of potato occurred in Restigouche County, New Brunswick, during 1921. This disease, and the dry stem-rot and black scurf caused by *Rhizoctonia*, are both briefly discussed.—*B. T. Dickson.*

1334. DICKSON, B. T. *Diseases of the potato.* *Sci. Agric.* 2: 310–312. 1922.—This paper deals with early blight, wilt or fusariose, common scab, and silver scurf.—*E. T. Dickson.*

1335. DICKSON, B. T. *Diseases of the potato.* *Sci. Agric.* 2: 325–327. *Fig. 13–14.* 1922.—Black dot disease, caused by *Vermicularia varians*, is described for the 1st time from America. The 1st symptom is a slight yellowing of the foliage beginning at the tips of the leaflets and gradually involving the whole leaves, which finally become brown and withered. Under moist conditions, minute black sclerotia develop on the surface of the leaves and both inside and outside the lower part of the stems.—Potato dry rots and net necrosis are also briefly described.—*Frederick V. Rand.*

1336. DICKSON, B. T. **Diseases of the potato.** *Sci. Agric.* 2: 417-419. 1922.—This concluding section of the series briefly discusses black heart, frost necrosis, net necrosis, internal brown spot, spindling sprout, hollow heart, and arsenical injury under the general heading, Physiological Diseases. The paper concludes with general considerations on potato disease control.—*Frederick V. Rand.*

1337. DICKSON, B. T. **Diseases of the potato.** *Quebec Soc. Protection Plants Ann. Rept.* 14: 67-105. *Fig. 1-12.* 1922.—This paper brings together in one place the series concluded in the preceding entry. Some 25 potato diseases are classified under 8 groups according to type of cause and the salient known facts concerning each are briefly discussed.—*Frederick V. Rand.*

1338. DICKSON, B. T. **Plant diseases of 1921 in Quebec.** *Quebec Soc. Protection Plants Ann. Rept.* 14: 52-58. *Fig. 1-8.* 1922.—A brief account is given of some 20 commonly occurring diseases. The year 1921 in Quebec was typically a year of *Fusarium* root-rots and of mosaics.—*B. T. Dickson.*

1339. FAULL, J. H. **Forest pathology in relation to forest conservation.** *Quebec Soc. Protection Plants Ann. Rept.* 14: 14-22. *Fig. 1-5.* 1922.—This is an account of an invitation address given before the Society. Needle blight of white pine, heart rot of birch, butt and heart rots of balsam, etc., are discussed.—*B. T. Dickson.*

1340. FISHER, D. F. **Spoilage of apples after harvest.** *Ann. Rept. British Columbia Fruit Growers Assoc.* 32: 51-56. 1921.—Blue mold rot due to *Penicillium expansum* is the most important storage rot. Control consists mainly in avoidance of mechanical injury and sanitation of the packing house. Cooling to 32°F. reduces infection but does not effectively check progress of the disease where infection has already taken place. Scald is largely due to abnormal respiratory conditions resulting from poor aeration. Immature apples are more susceptible than those picked at maturity. Constant air movement, especially during the earlier period of storage, prevents or reduces it. Although humidity and carbon dioxide are proved not to be the cause, probably some gaseous excretion is responsible. The use of a small quantity of certain mineral oils of the "liquid petrolatum" type on the wrapping paper promises the best means of control, some of these giving complete control under the most unfavorable storage conditions. The minimum quantity of oil effective, as well as the best kind, has still to be determined.—*J. W. Eastham.*

1341. GARDNER, MAX W. **Insects as disseminators of plant diseases. IV. Urgent problems of the future.** *Phytopathology* 12: 233-240. 1922.—From the standpoint of economic importance and scientific interest, the most important problems in relation to insect-disseminated diseases are connected with the so-called virus diseases of the mosaic type. Some of the problems enumerated are: the nature of the mosaic contagion, infective principle, or virus; the host range of each virus with special reference to wild carriers of infection; the physiology of infection; transmission by means other than insects; the development of disease-resistant varieties; a better understanding of the life history and longevity of insects known to transmit the disease; the method by which diseases are carried and transmitted by insects; and more exact knowledge as to the species of insects capable of disseminating diseases.—*B. Higgins.*

1342. GARDNER, WRIGHT A. **Notes on the physiology of the sweet potato.** [Abstract.] *Phytopathology* 12: 251. 1922.

1343. GREAT BRITAIN MINISTRY OF AGRICULTURE AND FISHERIES. **Collected leaflets on fungus pests of fruit trees.** Sectional Vol. I. 60p., 21 pl. London, 1921.—An introduction by A. D. COTTON discusses the nature of fungi and modes of attack, methods of control and of cultivation and use of resistant varieties. Then follow the "collected leaflets" which take up



in turn some of the leading facts regarding the following diseases and their control: apple canker (*Nectria galligena*); apple and pear scab (*Venturia inaequalis* and *V. pirina*); apple mildew (*Podosphaeria leucotricha* Salm.); brown rot of apples (*Monilia fructigena* Pers.); blossom wilt of apples (*Monilia cinerea* forma *Mali*); crown gall (*Bacterium tumefaciens*); silver leaf in fruit trees (*Stereum purpureum*); wither-tip and brown-rot of plums (*Monilia cinerea* forma *Pruni*); die-back of fruit trees (*Cytospora leucostoma*); peach leaf-curl (*Exoascus deformans*); American gooseberry mildew (*Sphaerotheca mors-uvae* Berk.); European gooseberry mildew (*Microsphaera Grossulariae* Lév); coral spot (*Nectria cinnabarina*); die-back of gooseberries (*Botrytis cinerea*); powdery mildew of the vine (*Uncinula necator* Burr.); and "reversion" or "nettlehead" of black currants. To this is added a list of 23 diseases of fruits not here discussed.—*Frederick V. Rand.*

1344. GREAT BRITAIN MINISTRY OF AGRICULTURE AND FISHERIES. Collected leaflets on cultivation and diseases of potatoes. Sectional Vol. III. ii + 69 p., 15 pl. (2 colored), 8 fig. London, 1921.—An introduction briefly outlines the history of the potato and adds a general statement concerning the diseases of this crop. The first three sections deal with the growing of the crop, and with the selection, storage, and treatment of the seed tubers. The remainder of the booklet discusses in turn the salient points regarding specific diseases and their control. The following diseases are taken up in some detail: blight (*Phytophthora infestans*); wart (*Synchytrium endobioticum*); powdery scab (*Spongopora subterranea* Lagerh.); blackleg (*Bacillus atrosepticus*); leaf-curl or leaf-roll; mosaic; scab (*Actinomyces scabies*); dry rot (*Fusarium caeruleum*); and *Sclerotinia sclerotiorum* Bref.—Other diseases more briefly described include skin-spot (*Oospora pustulans*); sprain; *Botrytis cinerea*; black scurf (*Corticium Solani*); violet root rot (*Rhizoctonia violacea*); pink rot (*Phytophthora erythroseptica*); *Verticillium* wilt (*V. albo-atrum*); streak; silver scurf (*Spondylocladium atrovirens*); and pit rot.—*Frederick V. Rand.*

1345. HABERLANDT, G. Wundhormone als Erreger von Zellteilungen. [Wound hormones as the cause of cell-division.] (Sonderabdruck aus den Beiträgen zur Allgemeinen Botanik, herausgegeben von G. Haberlandt, Bd. II, Hft. 1.) 53 p., 12 fig. Gebrüder Borntraeger: Berlin, 1921.—In studying the action of wound hormones on cell-division, tubers, roots, and leaves were mechanically injured. The tubers were cut into thin slices a part of which were washed under a heavy stream of water for 5-20 minutes, another portion covered with a thin layer of potato tuber ground up in a mortar, while others were held as checks.—In the case of kohlrabi roots cell-division was very slight in the washed slices or at least less frequent than in the unwashed slices, whereas in sections covered with a thin layer of macerated tissue there was abundant cell division.—Examination of leaves showed that under the brown cut edges every cell of the outer layer had divided and typical wound cork formation had followed, while cells in the regions remaining green had not divided with the exception of mesophyll cells directly under the injured epidermis. It was found that macerated tissue often caused cell-division in other members of the same plant family whereas it had no effect at all or was injurious to members of other families.—Tests with plant-hairs, epidermal cells, and guard cells showed that injury to individual cells when not severe enough to kill them caused typical nuclear division.—*Lillian C. Cash.*

1346. HARA, KANESUKE. Sosai kwaki no byôki to sono yobôhō. [Diseases of vegetables and ornamental plants and their control.] 145 p., 17 fig. Yoshimi Shoten, Shidzuoka, 1920. [In Japanese.]—This is a popular account for the grower, dealing with the principal diseases of vegetables and ornamental plants in Japan and recommendations for their control. An appendix takes up insecticides and insects injurious to vegetables.—*Frederick V. Rand.*

1347. HARTER, L. L. Field and storage diseases of the sweet potato and their control. [Abstract.] *Phytopathology* 12: 251. 1922.

1348. HASKELL, R. J. Relation of plant pathology to the newly organized Science Service. *Phytopathology* 12: 301-302. 1922.—Science Service with headquarters in Washington, D. C.,

has been organized for the purpose of gaining more rapid and accurate publicity for the results of scientific research by furnishing newspapers with accurate and well written articles. This outlet for popular articles on plant pathology presents an excellent opportunity to get information before the people in an easy, quick, and effective way.—*B. B. Higgins.*

1349. HOWARD, ALBERT. *Disease in plants.* Agric. Jour. India 16: 626-637. *Pl. 35-36, fig. 1-2.* 1921.—A popular account of a paper on the influence of soil factors on disease resistance, which appeared in Ann. Appl. Biol. 7: 373. 1921. [see Bot. Absts. 11, Entry 558.]—The discussion includes rust in wheat, green fly on fruit trees, red-rot in sugar-cane, and wilt diseases of several crop plants in Bihar.—*A. Howard.*

1350. LEE, H. ATHERTON. *Observations on previously unreported or noteworthy plant diseases in the Philippines.* Philippine Agric. Rev. 14: 422-434. *Pl. 17-24.* 1921.—Brief notes are given on 49 diseases of citrus fruits, banana, abaca (Manila hemp), maguey (Agave), pineapple, tobacco, coconut, and sugar-cane. Twenty-two of the diseases listed are recorded from the Philippines for the 1st time. A short general discussion concludes the paper.—*E. D. Merrill.*

1351. LEE, H. ATHERTON, AND MARIANO G. MEDALLA. *The season's experiments on Fiji disease, mosaic disease, and smut of sugar cane.* Philippine Agric. Rev. 14: 402-412. *Pl. 1-8.* 1921.—The season's experiments with Fiji disease of sugar cane show that germination of points from affected canes is much poorer than from healthy and that the occurrence of the disease is not directly connected with soil conditions but is transmitted by cane cuttings. The spread from diseased to adjacent healthy plants was surprisingly low throughout the season. The results show that the losses from this disease are largely due to the use of points or cuttings from diseased stools.—The results with mosaic of sugar-cane showed that the germination of points from affected stools is usually poorer than from healthy stools and that the disease may be produced at will on any soil irrespective of drought by using points from diseased stools. The experiments corroborate those in Java, Hawaii, and Porto Rico as showing that cuttings from diseased stools reproduce mosaic in a large percentage of cases, usually 100 per cent. An unexpected result was the very small amount of transmission from affected to healthy stools during the past season under Canlubang conditions. It is evident also that in the course of the season a small portion of plants may grow out of the disease to such an extent that leaf signs are no longer visible.—Experiments with cane smut showed that germination of points from smut-infected stools is reduced, that a large percentage of points or cuttings from such stools reproduce the disease, and that the cane yield in such cases is usually a total loss. In the 6 months under experiment the spread to healthy stools in the field was very small. Points from healthy stools soaked in the same receptacle with cane from smutted stools showed 8.33 per cent of resulting canes affected.—Planters growing susceptible varieties should select "seed" only from healthy stools.—*Frederick V. Rand.*

1352. LEE, H. ATHERTON, AND GONZALO MERINO. *The prevention of the importation of injurious insects and parasitic fungi on economic crops from foreign countries.* Philippine Agric. Rev. 14: 389-401. 1921.—This is a brief discussion of the author's Philippine experiences, with copies of local regulations adopted and a list of fruits prohibited from entry into the Philippines.—*E. D. Merrill.*

1353. MARLATT, CHARLES LESTER. *Protecting the United States from plant pests.* Nation. Geog. Mag. 40: 205-218. *16 fig.* 1921.—Insect and fungous enemies of plant life are discussed and illustrated, emphasis being placed on the quarantine measures now protecting the country against their introduction.—*W. M. Atwood.*

1354. MOLL, FRIEDRICH. *Untersuchungen über Gesetzmässigkeiten in der Holzkonservierung. Die Giftwirkung anorganischer Verbindungen (Salze) auf Pilze.* [An investigation of the chemical laws underlying wood preservation. The toxic action of inorganic com-



pounds (salts) on fungi.] Dissertation, Berlin, 1920: 23 p. 1920. [Published also in *Centralbl. Bakt.* II Abt. 51: 257-279. 1920 (See Bot. Absts. 10, Entry 788).]—A brief introduction and review of previous studies on wood preservation is followed by an account of the present investigation from which the author concludes that the poisonous or antiseptic action of salts is an additive character of their ions. In the sequence of their antiseptic activity the ions are: mercury, silver, cadmium, cyar, copper, zinc, cobalt, chromium, and fluorine. Most acid ions and the ions of the alkaline metals, alkaline earths, and aluminium may be considered inactive. The antiseptic action, using *Penicillium glaucum* and *Merulius* sp. as indicators, depends on the solubility and ionization of the salts in water. The specific antiseptic action is dependent on a specific chemical reaction. Admixture of other salts to the active substances may either retard or accelerate the disinfectant action but the end result is unaltered. The activity of a given quantity of a soluble salt or salt mixture depends only on the quantity of active ingredients in the mixture and on their specific activity. The static activity is dependent on the stoichiometric laws of chemical reactions. In so far as the salt mixture does not yield insoluble precipitates or complex compounds the individual ions retain their specific activity, and the activity of the mixture may be conceived as the sum of the activities of the individual ions.—*Frederick V. Rand.*

1355. NAVEL, HENRI C. Les principaux ennemis du cacaoyer aux Iles de San-Thomé et de Principe. Rapport sur une mission d'étude agricole et phytopathologique. [The principal enemies of cacao in the Islands of Saint Thomas and Principe. Report of an agricultural and phytopathological survey.] 135 p., 32 pl. (4 colored), 3 fig., 2 maps. Émile Larose: Paris, 1921.—An introduction gives the situation, size, geography, geology, and climate of these islands, and a general discussion of cacao enemies.—The body of the work takes up in turn the non-parasitic troubles, animal parasites (principally insects), and cryptogamic diseases of this host.—Among the non-parasitic troubles some space is given to a discussion of wounds, lack of proper hygienic measures, suppression of shade, insufficient rainfall, faulty methods of planting, drainage troubles, opening of holes for planting and manuring, and sudden death of the trees.—The principal animal parasites discussed are: *Heliothrips rubrocinctus* Giard. (thrips), *Helopeltis* sp., *Nisotra Theobromae*, *Aspidiotus trilobitiformis* Green and other species of cochineal insects, *Lymidus variicolor* Berlioz, *Zeuzera Coffeae*, *Eulphonolotus myrmeleon* Feld, *Mallodon Downesi* Hope, *Apate Monachus* L. (the last 3, borers), *Neotermes gestri*. F. Silv., *Microcerotermes parvus Theobromae* Dess., and *Mirotermes Amaralii* Seabra (the last 3, termites).—Among mammalian enemies, rats and monkeys are discussed and several other animal parasites are briefly noted.—The cryptogamic diseases taken up in detail are those caused by *Phytophthora Faberi* Maubl. (mildew and canker), *Lasioidiplodia Theobromae* (Pat.) Griff. & Maubl., drying of the ends of branches due to the combined effects of bad climatic and cultural conditions but accompanied by *Fusarium*, *Nectria*, and other apparently saprophytic fungi, and various forms of decay. Added notes are given relative to several other cryptogamic diseases of cacao.—A chapter on the general principles of culture and maintenance is followed by an appendix in which are discussed a disease of the palm-oil tree (*Elaeis guineensis*) caused by *Ganoderma applanatum* Pers.; injury to the cocoanut tree caused by the beetle *Oryctes latecavatus* Fairm.; and the preparation of fungicides and insecticides. A list of the principle publications on cacao concludes the work.—*Frederick V. Rand.*

1356. NOWELL, WM. Report on an investigation of froghopper pest and diseases of sugarcane in Trinidad. Bull. Dept. Agric. Trinidad and Tobago 18<sup>2</sup>: 57-69. 1919.—This report is a discussion of the "root disease" of sugar cane in Trinidad and the relation of the frog-hopper and species of *Marasmius* and *Odontia* to this disease. Remedial measures, such as sanitation, rotation, and manuring, are advised.—*Florence A. McCormick.*

1357. PEACOCK, N. D. The less common spray materials. [Abstract.] Phytopathology 12: 251-252. 1922.

1358. PEGLION, VITTORIO. Le malattie delle piante coltivate cagionate da parassiti vegetali o da agenti inanimati. [Diseases of cultivated plants due to vegetable parasites or

non-living agents.] 4th rev. and amplified ed., 663 p. Casale Monferrato: Ottavi, 1922.—The preliminary chapters deal with general subjects such as the economic significance of diseases with special reference to the crop, the scope of plant pathology, the classification of plant diseases, virulence, parasitism and resistance, fungicides and their application. The diseases of different crops are then treated in turn; in each case the causal organism, its effect on the host, and preventive treatment are considered.—*Lillian C. Cash.*

1359. RAMSAY, A. A. "Liquid sulphur." Agric. Gaz. New South Wales 33: 525. 1922.—Sodium sulphide has been recommended as a ground treatment under orchard trees. If there is virtue in the method there appears to be no reason why lime-sulphur should not be substituted.—*L. R. Waldron.*

1360. RAMSAY, A. A. Two investigations in relation to sprays. Agric. Gaz. New South Wales 33: 513-514. 1922.—With home-made tobacco infusions the end result relative to the degree of acidity is not essentially changed whether anhydrous sodium carbonate is or is not used. In the preparation of a triple-purpose spray consisting of Bordeaux mixture, tobacco extract, and lead arsenate the amount of soluble arsenic found in the filtrate after 2½ days was safely below the allowable minimum.—*L. R. Waldron.*

1361. RAND, FREDERICK V. Insects as disseminators of plant diseases. I. Results of past investigations. Phytopathology 12: 225-228. 1922.—In a brief discussion and summary of the results of previous work on the relation of insects to the dissemination of plant diseases, insect dissemination as a whole is divided, according to type, into 5 groups: (1) external dissemination and direct inoculation; (2) external dissemination without direct inoculation; (3) wound infection from sources other than the wounding agent; (4) internal mechanical (unchanged), and (5) internal biological dissemination (multiplying within the carrier).—By means of a table and brief discussion the author states that proof or strong evidence of insect dissemination has been published for 1 protozoan, 16 bacterial, and 41 fungous diseases; and for the filterable contagium group of diseases as affecting 66 hosts.—*B. B. Higgins.*

1362. SANDERS, T. W. Fruit foes. 106 p., 29 pl. (13 colored), 31 fig. W. H. & L. Collingridge: London, 1921.—This handbook deals with "the various insect, animal and fungal pests that attack fruit trees, with remedies for their prevention and eradication."—Under each of the following hosts, alphabetically arranged, is taken up its particular enemies: apple, apricot, blackberry, cherry, currant, fig, gooseberry, loganberry, nuts, peach and nectarine, pear, plum and damson, raspberry, strawberry, and the vine.—Parts II and III deal with sprayers and spraying, and with insecticides and fungicides.—*Frederick V. Rand.*

1363. STEVENS, H. E. Avocado diseases. Florida Agric. Exp. Sta. Bull. 161. 23 p., 6 fig. 1922.—All available information on avocado diseases in Florida is brought together.—Avocado scab (*Cladosporium Citri* Mas-see) as a disease of the foliage and fruit is most common on young plants in the nursery, where it is difficult to control. It is especially a foliage trouble on the varieties of the West Indian group but fruits of the varieties Trapp, Taylor, and Fuerta are also very susceptible. Infection takes place only on the tender young growth, plants becoming immune when the leaf tissue hardens. In the nursery badly infected old leaves should be sprayed with 4-4-50 Bordeaux mixture before new growth starts. After new growth begins spraying with ammoniacal copper carbonate solution should be repeated weekly until growth becomes hardened. A 3-3-50 Bordeaux mixture is sufficient to control scab on the fruit. On the lower East Coast of Florida black spot (*Colletotrichum* sp.) causes much loss in seedlings. These spots are round, brown to dark brown or black, ¼-½ inch in diameter, and the dry, hard tissues penetrate the skin of the fruit to the flesh, less matured fruit sometimes becoming misshapen. Spots also appear on the bark of young shoots. Bordeaux mixture (4-4-50) gives some control here. A 2nd application should follow 3-4 weeks after the 1st. Avocado blotch (*Cercospora* sp.) which frequently occurs first, and black spot are often found together. Avocado blotch causes a surface spotting on seedling fruits, spots being ¼-½ inch in



diameter. Its control is similar to that of black spot. Rusty blight (*Glæosporium* sp.) is troublesome in Hawaii and may be present in Florida. Other diseases mentioned are powdery mildew (*Oidium* sp.) of the foliage, though this is not likely to be troublesome; and russet fruit, which injures the fruit.—*J. C. Th. Uphof*.

1364. TICE, C. Seed potato inspection and certification in British Columbia. *Sci. Agric.* 2: 249–251. 1922.—The author presents a statement of the percentages of disease allowed.—*B. T. Dickson*.

1365. WENIGER, WANDA. Potato diseases and their control. (In: *Potato hand book*.) North Dakota Agric. Exp. Sta. Ext. Div. Circ. 50. 14–19, fig. 1–3. 1922.—Following a key to potato diseases, a brief popular discussion is given of disease control by rotation, seed treatment, selection, storage, and handling.—*Frederick V. Rand*.

## PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

H. W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 983, 1142, 1511, 1520)

1366. ANNETT, HAROLD E. Investigations of Indian opium. *Pharm. Jour.* 108: 192–193. 1922.—The investigation deals with the influence of environmental factors, such as manures, climate, season, and stage of development of the capsules on the quantity and quality of the opium produced. In 1 series 1,000 terminal capsules gave 31.4 gm. of dry opium containing 15.7 per cent of morphine, while 1,000 lateral capsules gave 12.8 gm. of dry opium, containing 8.2 per cent of morphine. The yield of morphine was greatest from opium collected about 8–16 days after flowering. Cattle manure, nitrates, phosphates, or seed cakes alone or in combination over 4 years had but slight influence on the morphine yield of opium but did increase the total yield of opium. Weather conditions have little effect on the morphine yield but a very notable effect on the opium yield. With pure seed and equally good methods of cultivation opium produced on the plains or in the hills of India runs as high in morphine content as Turkey opium.—Morphine is produced during the period of active growth at the same rate as the plant tissues; it accumulates in the capsule but is not used in the ripening of the seed; the theory that it is an end-product of metabolism, excretory in nature, seems to be borne out.—*E. N. Gathercoal*.

1367. BENNETT, C. T. Oil of Cade. *Pharm. Jour.* 107: 166. 1922.—Genuine Cade oil must be derived exclusively from the wood of *Juniperus oxycedrus* by dry distillation. It has always been somewhat variable in character, particularly as regards specific gravity. In the British Pharmacopoeia it is "about 0.990"; in the United States Pharmacopoeia the specific gravity is stated as "0.980 to 1.055 at 25°." During the last few years there has been difficulty in obtaining this oil with the specific gravity over 0.975. It is now produced commercially mostly in Spain, and genuine Spanish oil may run as low as 0.955.—The bushy shrub of Juniper grows abundantly in the chalky marl of Provence and adjacent provinces. The heartwood is richest in oil, increasing in its content towards the roots. The bark is removed and the wood chipped as small as possible. The dry or destructive distillation is performed in cast-iron boilers, filled with shavings or chips of the wood, with a delivery tube at the bottom and by means of a brisk fire of wood completely surrounding the boiler. The blackish viscid distillate upon standing for a considerable time separates into 3 layers, the oil of Cade being uppermost. Spanish Cade oil, though of low specific gravity, can be accepted as genuine; it contains a high proportion of cadinene.—*E. N. Gathercoal*.

1368. BURTT DAVY, JOSEPH. Utilization of maize flowers. Stalks and leaves 1. *South African Jour. Indust.* 5: 324–329. 1922.—This instalment deals with the medicinal uses and

properties of maize silk (*Stigmata Maydis*) and maize smut (*Ustilago Maydis*). It also contains a preliminary paragraph on the utilization of Maize stalks as a source of syrup, cane sugar, alcohol, etc.—*Sydney M. Stent*.

1369. COMPTON, R. H. Medicinal and aromatic plants in South Africa. Jour. Bot. Soc. South Africa 8: 9-11. 1922.—Aloes is the evaporated juice of the leaves of *Aloe ferox*. *Buchu folia* is the dried leaf of *Barosma betulina*, *B. crenulata*, and *B. serratifolia*. "Bitter blaar" (*Brachylaena elliptica*), "Kankerbos" (*Sutherlandia frutescens*), "Zandolien" (*Dodonea Thunbergiana*), and "Kruidje-roer-my-niet" (*Melanthus niger*) are highly esteemed home-made medicaments. The possibility of producing essential oils in South Africa is being studied at Kirstenbosch.—*E. P. Phillips*.

1370. COUCH, JAMES F. Note on the oil of *Agastache pallidiflora*. Amer. Jour. Pharm. 94: 341-343. 1922.—Having had his attention directed to this plant by the intense fragrant odor, the author subjected several lots of the flowering heads and leaves to distillation. The flowers yielded 0.184-0.316 per cent of oil and the leaves 0.083 per cent. The oils obtained from the flowers possessed a penetrating peppermint odor with a marked suggestion of thyme, while the oils from the leaves possessed a rank thyme odor. Physical constants for the oil from the flowers are: density at 20°, 0.91924; specific rotatory power at 25°, 8.60; index of refraction at 25°, 1.4865. No separation of crystalline material was obtained by cooling and the tests for phenols were negative.—*Anton Hogstad, Jr.*

1371. E[ATON], B. J. Ipecacuanha. Alkaloidal content of leaves and stems. Agric. Bull. Federated Malay States 9: 178. 1922.—In the roots the percentage of alkaloids was found to be 2-2.5, of which  $\frac{1}{2}$ - $\frac{3}{4}$  was emetine; in the stems and leaves the amount of alkaloids was 1.5 per cent, of which 0.45 was emetine.—*I. H. Burkill*.

1372. EZENDAM, JOH. A. De kwantitatieve botanische analyse van veevoedermiddelen. [The quantitative botanical analysis of feeding cakes.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 25: 1-82. Pl. 1-6. 1921.—The author explains the advisability of a quantitative analysis of feeding cake, etc., to determine its purity. He mentions and discusses the most important methods of analyzing linseed cake and those used for analyzing other feeding cakes. The methods investigated and the author's comment on their general or specific practicability are as follows: (1) Method of Pesch,—impractical. (2) Method of Schaffnit,—impractical. (The author's modification of this method is too lengthy, and is practicable only for linseed cake investigation.) (3) Method of Grevillius,—too time consuming and practicable only for linseed cake. (4) Method of Schoute,—the same conclusion as in (3). (5) Netherlands or counting method,—useful only for linseed cake and rapeseed cake investigations. (6) Mechanical-optical analysis of van Weinzierl,—not sufficiently accurate and practical only for special cases. (7) Method of Kühn,—very good for quantitative analysis of those particles which have a much higher or lower specific weight than the feeding cake in which they are present; therefore useful only in special cases. (8) Method of Hintner,—may be used in some cases where the particles to be analyzed are coarse and may easily be recognized or made recognizable. (9) Method of Kole,—practical for determination of contents of cottonseed husks in cottonseed meal. (10) Method of Arthur Meijer, like the method of Huss, is practical when there are particles present which can be used for measurements. The author developed a method in which the principle was to find an element for measuring in those cases in which the amount of a certain constituent could not be found from a comparison by counting (Netherlands method), or from a comparison by measuring (method of Schoute), or when no measurable elements or particles were present, according to the method of Arthur Meijer. The author grinds a sample of the cake until it passes a screen with circular holes 1 mm. in diameter. A definite quantity (0.5-2 gm.) is boiled with acids and alkali and washed with hot water on muslin cloth (43 threads per cm., opening in wet cloth  $\approx$  100  $\mu$ ). The remaining substance is mixed with 10 cc. of a mixture of glycerine and water (1:1). This is spread on a special glass plate and measurements are made with a Nebelthau or similar micro-



scope, using objective 3 and net micrometer-ocular 3 of J. C. Schoute. After 15 minutes particles are measured in at least 3 strips and at least 300 fragments. Measuring is the determination of the number of squares each particle covers. Then the sum total of the squares covered by all particles is divided by the number of grams used, the total surface of the rows (each row is 1.2 square cm.), and by the normal number. The number obtained gives the percentage of the impurity or particles present.—The normal number is the number of squares covered by the fragments of impurities, or of a certain substance, present on 1 square cm. using 1 gm. of a 1 per cent mixture of impurity or substance. The normal number must be determined for each impurity or substance. The author states that the usefulness of this method depends mainly upon the exactness of the normal number. Plates give photographs and drawings of some of the impurities investigated. Investigations were made and normal numbers determined for the following impurities or admixtures: rice husks, barley husks, ground nut shells, coffee husks, cacao husks, soy bean, and impurities in linseed cake. [See also Bot. Absts. 11, Entry 647].—*Peter J. Klapaak.*

1373. FARWELL, O. A. Botanical source of the cola nut of commerce. Amer. Jour. Pharm. 94: 428. 1922.—Quoting I. H. Burkill in Notes on Cola Trees in the Economic Garden, Singapore [see Bot. Absts. 8, Entry 1540], the author states that the *Sterculia acuminata* Beauv. of Benin does not produce the Kola Nut of Sierre Leon, which is the Kola of commerce, but that the larger part is derived from *Sterculia nitida* Vent. He also points out that *Bichea* Stokes (Bot. Mat. Med. 2: 564. 1812) is the oldest generic name for these species and therefore *Sterculia nitida* Vent. Jard. Malm. sub. t. 91, 1804, should be *Bichea nitida* (Vent.) Farwell n. comb.—*Anton Hogstad, Jr.*

1374. FARWELL, O. A. *Osyris alba* substitute for *Scoparius*, N. F. Amer. Jour. Pharm. 94: 429. 1922.—Attention is called to the fact that *Osyris alba* is again making its appearance as a substitute for Broom Tops, to which it bears a close resemblance. It may however be detected by the following characters: (1) the stems are many-striate instead of 5-angled or winged; (2) the buds are at the apex of an angle, which forms a keel on the dorsal side of the bud, instead of in the channels between the angles; (3) the wood is white instead of yellowish.—*Anton Hogstad, Jr.*

1375. GARRIGUES, A. Les plantes en médecine: le seigle et l'ergot. [Medicinal plants: rye and ergot.] 254 p., 22 fig. Libr. Octave Doin: Paris, 1921.

1376. GATHERCOAL, E. N., and R. E. TERRY. What is aloes, U. S. P.? Jour. Amer. Pharm. Assoc. 11: 523-526. 1922.—In reviewing the characteristics of, and the various tests applied to aloes, the authors suggest that it is no longer worth while to differentiate between the 3 kinds of aloes, especially from a therapeutic standpoint, since no physician specifies the use of any particular kind of aloes or aloin. They suggest that, as the value of aloes is not entirely due to aloin, there is excellent opportunity for study of the therapeutic activity of aloes compared with aloin.—*Anton Hogstad, Jr.*

1377. GUNTON, J. A., and G. D. BEAL. A reinvestigation of the proximate composition of *Rhamnus frangula*. Jour. Amer. Pharm. Assoc. 11: 669-682. 1922.—In this investigation to determine whether the anthraquinone derivatives were present in the free form or principally in combination, possibly as a glucoside, the glucoside frangulin was found to agree in properties with that which has been previously described; M. P. 229°, and upon hydrolysis yielding emodin and rhamnose. Emodin, the principal hydroxyanthraquinone present, was found in both free and combined forms and agrees with the properties of that from *Cascara* and *Rumex crispus*; M. P. 253°. Chrysophanic acid was found free and associated with monomethyl ether; M. P. 190°. Various other constituents resulting from the analysis are discussed.—*Anton Hogstad, Jr.*

1378. HEYL, F. W. Some constituents of *Viburnum opulus*. Jour. Amer. Pharm. Assoc. 11: 329-336. 1922.—By extracting the drug with methyl alcohol and pouring the extract into water, a resin was obtained in which acetic, valerianic, caproic, caprylic, formic, oleic, linoleic, cerotic, and palmitic acids were found in the ligroin extract.—Anton Hogstad, Jr.

1379. HOLMES, E. M. Oregon balsam. Pharm. Jour. 108: 146-147. 1922.—The author reviews and compares the source, method of collection, and uses of Canada balsam and Oregon balsam. As the cost of Oregon fir balsam is about  $\frac{1}{3}$  that of Canada balsam, it will probably replace the latter for many purposes, except in microscopic technique.—E. N. Gathercoal.

1380. HOPKINS, J. L. Crude drugs—their selection and milling. Jour. Amer. Pharm. Assoc. 11: 521-523. 1922.—The author remarks briefly on the great care exercised in collecting, milling, and examining crude drugs in order that the materials may represent the highest percentage of purity and potency.—Anton Hogstad, Jr.

1381. KABAYAO, D. S. The effect of heating *Cocculus indicus* in relation to chemical identification of picrotoxin. Amer. Jour. Pharm. 94: 425-428. 1922.—By heating the kernels in a nickel crucible over a free flame and then extracting by the modified Stass-Otto, method the extracted poison gave a negative reaction with Langley's reaction and also with Fehling's solution. The extracted poison, however produced the typical picrotoxin convulsions when injected into the dorsal lymph sac of the frog. In another experiment the kernels were heated in an oven at 104°C. and extracted as above. In this case the Langley and Fehling reactions, as well as the physiological reaction, were positive. By heating commercial picrotoxin above its melting point (203°C.) negative tests were obtained with Langley's and Fehling's solution. By these experiments the author has shown that the intramolecular rearrangement is due to heating at a high temperature and probably not to oxidation changes, as one heating experiment was carried on in a stream of hydrogen. The author states that the commonly recognized tests for the identification of picrotoxin cannot be depended upon when, as is the custom, the berries have been roasted over a free flame.—Anton Hogstad, Jr.

1382. KARSTEN, GEORGE, und WILHELM BENEKE. Lehrbuch der Pharmakognosie. [Text book of pharmacognosy.] 8 vo, 3rd ed., vi + 398 p., 544 fig. Gustav Fischer: Jena, 1920.

1383. LAVIALLE, P. Les plantes médicinales. [Medicinal plants.] Mulhouse, 1921.

1384. LLOYD, J. U. Vegetable drugs. The Caxton: Cincinnati, 1921.

1385. MACBETH, ALEXANDER KILLEN, and ROBERT ROBINSON. Cevadine. Part I. Jour. Chem. Soc. [London] 121: 1571-1577. 1922.—The paper deals with the optical activity, products of hydrolysis, and distillation compounds of cevadine, a crystalline alkaloid occurring in the mixture of bases termed "veratrine," first isolated from the seed of *Veratrum sabadilla*.—F. E. Denny.

1386. MUSZYNSKI, JAN. Investigations of Polish foxglove. Pharm. Jour. 107: 443. 1922.—There are 2 kinds of foxglove in Poland,—*Digitalis purpurea* L. and *D. ambigua* Murray,—though the former is very rare. The latter is abundant throughout almost every part of the country and is collected not only for local uses but also for export. An examination of the physiological action of the 2 plants cultivated at the state medicinal farm was made, the physiological method of Focke using *Rana esculenta* being employed. Strophanthinum Crystal, Merck, 1: 10,000, was always used as a check. About 200 experiments were carried out. The following conclusions were reached: (1) *D. ambigua* should be accepted by pharmacopoeias as the substitute of *D. purpurea*. (2) The garden foxglove (*D. purpurea* var. *gloxiniæflora*) produces a good drug. (3) The requirements of pharmacopoeias should permit the collection of flowers and leaves of the 1st year's growth. (4) A physiological assay of foxglove is necessary for its control.—E. N. Gathercoal.



1387. PARRY, E. J. **The chemistry of essential oils and artificial perfumes. I. Monographs on essential oils.** 4th ed., rev. and enlarged, viii + 549 p., 52 fig. Scott, Greenwood & Son: London; D. Van Nostrand Co.; New York, 1921.

1388. PRICE, E. A., and NOEL L. ALLPORT. **An improved method of preserving specimens for a herbarium.** Pharm. Jour. 108: 9-10. 1922.—The plant parts are placed between white blotting paper, 6 sheets above and 6 below, and pressed for 20 minutes with an ordinary 2-pound flat iron heated to about 110°C. There should not be sufficient heat to decompose the chlorophyll or other coloring matters. The plant parts become dry and rigid but otherwise retain their natural appearance and color. The specimen should be painted over with a 0.5 per cent solution of mercuric chloride in absolute alcohol and mounted on herbarium paper with mucilage of acacia. The leaves or flowers may be separated from the axis and the latter partially or wholly dissected. After the preservation treatment the parts are strong and inflexible and there is no difficulty in reassembling the parts. With the Compositae and Orchidaceae especially successful work has been done. A collection of plants preserved and mounted as described has retained the color of both flower and foliage for 8 years.—E. N. Gathercoal.

1389. SMALL, JAMES, and F. M. J. ADAMS. **Yohimbe bark: Its history and identification in commerce.** Pharm. Jour. 108: 282-285, 311-314. 12 fig. 1922.—Genuine yohimbe bark, derived from *Pausinystalia Yohimba*, usually occurs in channelled pieces, 4-10 mm. thick, with a varying tinge of red in the grey-brown or brown outer and inner surfaces; the outer surface is longitudinally furrowed, the edges of the furrows scarcely or not at all raised above the general level of the surface; numerous narrow transverse cracks occur on the outer surface at fairly regular intervals of 1-2 cm.; the cork adheres closely. Occasionally such bark is derived from very old tree trunks, and is then dark red on the inner and cut surfaces; 15-20 mm. thick; with a scaly outer bark showing few or no transverse cracks. Occasionally also this bark seems to be derived from the smaller branches rather than from the trunk of the tree, and is then much thinner, 2-3 mm. thick; while the transverse, cracks are very narrow, shallow, and inconspicuous, but still evident on careful inspection. Transverse sections under the microscope show a characteristic "beaded" alternation of bast fibers with parenchymatous cells, and also show little or no "twinning" of the bast fibers, especially in the outer zone of the bast where the rows are fewer. A few scrapings from the inner surface of the secondary bast, when shaken with dilute caustic soda solution (10 drops of a solution of NaOH, sp. gr. 1.168 in 30 cc. of water) give a red color, varying in different samples from wine-red to distinctly reddish-brown. Treated in the same way with dilute ammonia (5 drops of 0.880 solution in 10 cc. of water) the same colors are developed; this ammonia test is usually more distinctive but the color may develop more slowly. False yohimbe bark, derived from *Pausinystalia macraceras*, usually occurs in channelled, or flattened and severely scraped pieces; 4-15 mm. thick; with little or no red tinge; usually with a dark brown outer surface, showing, when unscraped, characteristic longitudinal furrows, the edges of which are puckered so that they stand up as rounded ridges above the general level of the surface; transverse cracks when they occur are few and very irregularly spaced; the cork frequently exfoliates easily. Transverse sections under the microscope show little or no "beading" in the radial rows of bast fibers, but do show "twinning" of these fibers; this feature, when it extends to the outer bast, is a good diagnostic character. A few scrapings from the inner surface, treated with caustic soda or ammonia as described above, give a brown color, with a faint tinge of red. The barks of *Pausinystalia Talbotii* Wernh., *Corynanthe paniculata*, and *C. Lane-Poolei* were examined and compared with true yohimbe bark. The illustrations are valuable and a table of diagnostic characters of each of the barks is appended.—E. N. Gathercoal.

1390. SMOĐLAKA, N. **The history and therapeutic properties of valerian.** Pharm. Jour. 107: 402-405. 1922.—Valerianic acid is considered the active principle of valerian, occurring in the drug as the borneol ester. This salt of the acid prepared synthetically has been used for some 20 years, but is not considered as satisfactory as the drug itself and does not re-

place the drug for the treatment of hysteria, neurasthenia, nor affections of the heart. This confirms once more Tschirch's hypothesis that in a drug, in most cases at least, not one or the other active principle is the exclusive therapeutic agent, but that the physiological effect is a result of the complex of active principles. One of the best galenicals is the dialysate, prepared from the fresh root in which the enzyme has been destroyed by heating the root to 80°C. in acidulated water. This process is known as stabilization. The author found that he could stabilize valerian by keeping it in vacuo above boiling water for ten minutes at 100°C. Preparations made by extraction with alcohol and with ether gave extractions that were equally fit if not superior to the extract obtained by dialysis. In fact, it would appear that the therapeutic effect is due to the resin contained in the drug rather than to volatile oil. This hypothesis is borne out by pharmacodynamic experiments with frogs. Extract in aqueous or hydro-alcoholic solution cannot be kept in good condition; it deteriorates very quickly in contact with water. The ethereal tincture of the fresh stabilized drug is undoubtedly the best form in which to preserve the active principles.—*E. N. Gathercoal.*

1391. STENT, SYDNEY M. "Dubbeltje" (*Tribulus terrestris*) and Geeldikkop in sheep. Jour. Dept. Agric. Union South Africa 4: 548-551. 1 fig. 1922.—This weed belongs to the family Zygophyllaceae and bears fruit armed with sharp-pointed spines. In certain stages of growth under certain climatic conditions it is poisonous to sheep and goats, and it has been determined that when these animals grazed on dubbeltje veld during hot sunny days, succeeding a heavy fall of rain, when the plant is green and succulent and in the flowering stage, are certain to contract the disease "Geeldikkop" (*Tribulosis arium*). This disease is described and remedies prescribed.—*L. Goldblatt.*

1392. STENT, SYDNEY M. Poisonous properties of Sudan grass. Jour. Dept. Agric. Union South Africa 4: 446-447. 1922.—This grass, like the ordinary sorghum, sometimes causes poisoning in stock owing to the presence of a compound of prussic acid. Glucose, dextrose, and other sugars act as antidotes, while a teaspoonful of soda dissolved in a pint of diluted vinegar has been found an effective remedy. Feeding the animals on starchy food before turning them into the Sudan grass diminishes the danger of poisoning. When made into hay Sudan grass is very unlikely to be harmful.—*L. Goldblatt.*

1393. TANRET, GEORGES. Sur la composition chimique de l'ergot de diss et de l'ergot d'avoine. [On the chemical composition of the ergot of *Ampelodesmos* and of oats.] Compt. Rend. Acad. Sci. Paris 174: 827-830. 1922.—The ergot of *Ampelodesmos tenax*, a plant of northern Africa, and that of oats have the same medicinal principles as does the ergot of rye. The ergot of *Ampelodesmos* is low in crystallizable ergotine; while that of oats has a higher ergotine content than the ergot of rye.—*C. H. Farr.*

1394. VIEHÖEVER, ARNO. Problems, we, as officials, have in common with the trade. Jour. Amer. Pharm. Assoc. 11: 592-595. 1922.—The author discusses some of the many problems confronting the honest dealer in crude drugs and the officials entrusted with the enforcement of the U. S. A. Foods and Drugs Act. Among the problems considered are methods of collection, drying, cleaning fresh drugs and spices, storing, and sampling. Reference is included to some of the tests applied during the course of examination of crude drugs.—*Anton Hogstad, Jr.*

1395. WHELAN, JULIA. Oil of *Bystropogon canus*. Jour. Amer. Pharm. Assoc. 11: 337-338. 1922.—Upon subjecting 28 pounds of herb to distillation, 25.5 gm. (= 0.2 per cent) of oil separated from the aqueous distillate and 13.7 gm. were obtained by 3 cohobations. Both oils were of greenish color, not unlike Bergamot oil. The original oil appeared to have more of the nature of fatty acid esters than of menthol. Tests, for pulegone, thymol, menthol, and carvacrol were negative. On account of the small amount of oil at hand no chemical examination was made. A few constants are included.—*Anton Hogstad, Jr.*

1396. YOUNGKEN, HEBER W., and C. H. LAWALL. *Anatomical and chemical studies of the sand spur (Cenchrus tribuloides L.)*. Amer. Jour. Pharm. 94: 567-583. Fig. 1-14. 1922.—In their endeavor to ascertain the cause for the inflammation, which is in many instances induced by the spines of the plant, the authors find that their tests tend to show that formates may be present in certain cells of the epidermis, sclerenchyma fibers, and barbs of the younger spines of the burs. Tests for alkaloids as well as for glucosides or other similar toxic principles were negative. Various extracts made from mature burrs with water, ether, petroleum, or alcohol lacked activity or irritating properties as indicated by taste or by inoculation with pin prick. The authors have also reviewed the previous literature and have presented detailed anatomical characters which are accompanied by many original figures.—*Anton Hogstad, Jr.*

## PHYSIOLOGY

B. M. DUGGAR, *Editor*

W. J. ROBBINS, *Assistant Editor*

(See also in this issue Entries 955, 1011, 1022, 1053, 1063, 1064, 1113, 1121, 1123, 1203, 1273, 1295, 1316, 1342, 1345, 1366, 1513, 1517)

## GENERAL

1397. KAYSER, E. *Microbiología agrícola, aplicada a la fertilización del suelo*. [Agricultural microbiology with application to soil fertility.] [Translation from the 4th French ed.] 351 p., 49 fig. P. Salvat: Barcelona, 1921.—This volume is one of a series of works constituting an "Encyclopedia of Agriculture" and at the time of its appearance 29 had been published, and 5 others were in press or in preparation, all dealing with applied sciences or technical agriculture. In part 1 of the present volume 21 pages are devoted to a general discussion of microorganisms, and 36 pages to the influence of physical and chemical agents upon such organisms, including a discussion of culture methods and staining properties. In part 2 (269 p.) there are treated successively the distribution of microorganisms in the superficial layers of the soil, the formation of humus, nitrification, decomposition phenomena, denitrification, purification and use of sewage, fixation of nitrogen, and the cycle of sulphur and iron. In an appendix of 13 pages the importance of soil reaction and methods of determining H-ion concentration are succinctly presented.—*B. M. Duggar.*

1398. OSTWALD, W. *Grundriss der Kolloidchemie*, 6 Auflage. [Outlines of colloid chemistry, 6th ed.] Fasc. 1. 330 p. Th. Steinkopf: Leipzig, 1921.

1399. OSTWALD, W. *Kleines Praktikum der Kolloidchemie*. 2 Auflage. [Practical colloid chemistry. 2nd ed.] 159 p. Th. Steinkopf: Leipzig, 1921.

1400. SVEDBERG, T. *The formation of colloids*. viii + 127 p., 22 fig. J. and A. Churchill: London, 1921.

## DIFFUSION, PERMEABILITY, PHYSICO-CHEMICAL PHENOMENA

1401. CHURCHMAN, JOHN W. *The selective bacteriostatic activity of sulfanilic acid*. Proc. Soc. Exp. Biol. and Med. 19: 317-318. 1922.—The sulfonic acid groups in acid-fuchsin are responsible for its ability to kill gram-negative organisms while sparing gram-positive aerobes. This affords data for determining the cause of the difference between these 2 types of organisms.—*M. M. Brooks.*

1402. DAHLBLOM, TH. *Osmotiska Trycket I Vattenlosnigar och dess Betydelse en Dissociation och Loslighet*. [Osmotic pressure in aqueous solutions and its importance to ionization and solubility.] 53 p. Nordisk Rotogravyr: Stockholm, 1921.



1403. DOERR, R. *Kolloidchemische Wirkungen der Salze seltener Erden und ihre Beziehungen zu den Flockungsreaktionen der Antikörper.* [Colloid chemical action of the salts of the rare earths and their relation to the flocculation of antibodies.] *Kolloid Zeitschr.* 27: 277-292. 1920.—Salts of the rare earths (Th, Ce, Pr, and La) agglutinate suspensions of red blood corpuscles, bacteria, and fungous spores, and precipitate protein solutions even when the salt is not in the colloidal condition nor hydrolytically dissociated in solution. This occurs even in very dilute solutions (1 part thorium sulphate in 5,000-10,000 parts of the reaction mixture). Although Th with a valence of 4 is more active than La, Ce, or Pr with 3, the flocculating power is not dependent alone upon the valence but varies with unknown properties of the rare earth and of the protein. These salts are toxic for all protoplasm, but the mechanism is not a simple protein precipitation, for the precipitation is reversible in an excess of protein, whereas the poisoning is not. Spores of bacteria and fungi are not affected because of their impermeable membranes, their agglutination thus appearing to be a surface phenomenon. Protein precipitation is inhibited by an excess of either reactant, there is a minimal salt concentration below which flocculation does not occur, and this varies with the rare earth employed, being lowest for Th. Flocculation depends upon a weak union of protein and salt, as in flocculation with the heavy metals, the complex formed being colloid chemically inactive, easily reversible, dissolves quickly and completely in an excess of either protein or salt and the solvent action is proportional to the precipitating action. An analysis of the flocculant with Lowe's interferometer shows that the amount necessarily depends not only on the relative concentrations but also on the cation of the salt and is 3 times as great with a unit weight of Th as with 20 times this weight of cerium chloride. In many ways immune precipitation resembles protein precipitation by Th and Ce. It shows the same dependence upon the concentration of the reaction components, is prevented by an excess of one component, and is characterized by reversibility of the reaction product. The interferometer shows that the precipitate contains all the material lost from the solution, whether the precipitation was immune precipitation or that produced by rare earths, and this renders the conception of fermentative processes of the protein antigen unnecessary to account for the immune precipitate.—*H. E. Pulling.*

1404. GIRARD, PIERRE, W. MESTREZAT, et V. MORAX. *Recherches expérimentales sur la perméabilité des tissus vivants aux ions.* [Experimental studies on the permeability of living tissues to ions.] *Compt. Rend. Soc. Biol.* 87: 69-72. 1922.—This paper deals entirely with theoretical considerations of the selective permeability of the cell wall to ions.—*S. Morgulis.*

1405. HOOKER, MARION O., und M. H. FISCHER. *Ueber die Quellung und "Lösung" von Aleuron.* [Concerning the swelling and "solution" of aleurone.] *Kolloid Zeitschr.* 26: 49-58. 1920.—The natural mixture of plant proteins known as aleurone behaves in swelling and solution phenomena like the proteins previously investigated,—gelatin, fibrin, blood serum, and gluten. The degree of swelling does not run parallel to the concentration of the H ion nor of the OH ion, although acids and alkalies induce aleurone to swell more than does pure water alone. Neutralization does not stop swelling although the addition of neutral salts does. Swelling and solution are not the same although they often occur together and operate in the same direction.—*H. E. Pulling.*

1406. MONTFORT, C. *Die aktive Wurzelsaugung aus Hochmoorwasser im Laboratorium und am Standort und die Frage seiner Giftwirkung.* Eine induktive ökologische Untersuchung. [Active root absorption from bog water in the laboratory and in the field, and the question of its toxicity. An inductive ecological investigation.] *Jahrb. Wiss. Bot.* 60: 184-255. 1921.—The main thesis of this paper is that although bog water used in the laboratory does have a toxic effect on roots, Schimper's hypothesis of "physiological drought" in bogs must be either abandoned or greatly modified. Attention is called to the fact that some hydrophytes do occur in bogs and experiments are described indicating that bog plants absorb water readily from the bog substratum. The author used guttation and bleeding phenomena as a

measure of water absorption by roots. The validity of this method has been tested and reported [Jahrb. Wiss. Bot. 59: 467-524. 1920]. Seedlings of *Zea Mays* were placed in "sphagnum water" and in "secondary peat water," also bog plants (Hochmoorpflanzen) were placed in bog water (Sphagnum-Wasser der Rhizosphäre) each being covered with a moist bell jar. *Zea Mays* absorbed water more readily from sphagnum water and secondary peat water than from a nutrient solution or from tap water, though the difference regarding tap water disappears with time. The initial increase is greater in secondary peat water than in sphagnum water. Experiments with distilled water show that this increase as compared with nutrient solutions and tap water cannot rest solely on low osmotic pressure in the bathing medium. This action is not specific for acid bog water, since it is found also in the pit water from lignite coal which is chemically similar to "Flachmoor" water. Guttation and bleeding continued for weeks in bog plants in the laboratory in sphagnum water. Water loss is possible only with a corresponding rate of intake of water through the roots. When this rate of intake is decreased osmotically the giving off of water ceases.—Bog plants in secondary peat water first show an increase in the rate of water intake. The second stage of toxicity, the decrease in the rate of water intake, in this medium is reached earlier in *Eriophorum vaginatum* (a bog plant) than in *Zea Mays*. Bleeding of bog plants is stopped after 7 days in strong peat extract, while in sphagnum water both guttation and bleeding still continue. When plants in peat water have stopped bleeding they can be caused to bleed again by adding distilled water. A strong extract of the peat water used in these experiments is unquestionably toxic, while field observations indicated that the natural soil water bathing the roots of *Eriophorum* is not.—In the field work typical bog plants of the 3 ecological classes (hydrophytes, mesophytes, and xerophytes) were investigated in bogs in various localities and at different elevations. In primary raised bogs guttation occurred in all of the plants investigated except *Andromeda*, *Scirpus*, and *Juncus*. These bled only when the leaves were cut. *Eriophorum*, *Scheutzeria*, and *Juncus* also show that water loss is not slower in the field than in the laboratory, and that such loss is dependent merely on the rate of water intake.—In secondary bogs the physical properties of the soil exert on the plants an influence that may be called "physiological drought" comparable to high osmotic pressure of the soil solution, but really independent of the chemical character of the water. Here it is a complex of soil factors that is important.—Even relatively weak bog water has a serious toxic effect on the root system of *Zea Mays* and other non-bog plants, the injuries being diverse; but those changes do not necessarily go hand in hand with the second stage of toxicity—the decrease in water absorption. The absorbing cells were living even when the growing tip was dead.—The roots of bog plants develop normally in bog water. Root hairs are not formed on roots that penetrated deep into the sphagnum; but where formed, they show little or no toxic effects and their absence cannot be regarded as a symptom of toxicity. Normal root hairs develop in the drained peat of secondary raised bogs. Far-reaching conclusions on the ecology of bog plants cannot be drawn from observations on non-bog plants.—The author agrees with many of the American workers (Livingston, Transeau, Dachnowski, Rigg) as to the toxic effect of bog water and soil on the growth of non-bog plants, but conclusions cannot be drawn from these as to the behavior of bog plants in bogs. In relation to the ecology of bog plants there is an essential distinction between the physiological-ecological and the physico-chemical investigations of the American workers. The former have been somewhat misleading, while the latter have contributed much to an understanding of the complex of soil factors in bogs.—G. B. Rigg.

1407. NEUSCHLOSS, S. M. Untersuchungen über antagonistische Wirkungen zwischen Ionen gleicher Ladung. [The antagonistic action of ions of equal electric charge.] Kolloid Zeitschr. 27: 292-306. 1920.—The chlorides of alkalis, alkaline earths, and aluminum increase the surface tension of lecithin hydrosols, and by continued addition of salt the surface tension reaches a maximum. The same salts retard the action of invertase on cane sugar, and the greater the concentration of the salt or the valence of the cation the greater is the effect. The influence of salt on fermentation is paralleled by its effect on the dispersion of the ferment solution. Both processes are well represented by the adsorption isotherm. This leads to the belief that inhibition of ferment action by neutral salts is produced by diminishing the active

surface of the ferment. In all processes mentioned above, mixtures of the salts plainly exhibit antagonism. The surface tension of lecithin solutions, the inhibition of ferment action, and the surface tension of the ferment solution are chiefly, if not entirely, dependent upon the relative concentration of the cations present and independent, within wide limits, of the absolute concentration. The physico-chemical basis of the ion-antagonism lies in the ability of cations to force each other from their adsorption complexes into the surface of the colloid particles. This antagonism alters slightly the coefficient  $K$  of the adsorption isotherm which reaches its maximal value with maximum antagonism. The relative amounts at which the salts are maximally antagonistic is uniquely dependent on the valence of the cation. With cations of equal valence the ratio is 1:1; with one twice that of the other the ratio is 1:20; three times, 1:100. The only exception is when sodium and potassium salts act on the surface tension of lecithin solutions; in such an experiment the maximal action occurs not with the ratio Na:R = 1:1 but 1:20. Another maximum is found when the concentrations are in the ratio K:Na = 1:20. For this no explanation has been found.—*H. E. Pulling.*

1408. NEWTON, ROBERT, and ROSS AIKEN GORTNER. A method for the estimation of the hydrophilic colloid content of expressed plant-tissue fluids. *Proc. Soc. Exp. Biol., and Med.* 19: 356. 1922.—This method is based primarily on freezing-point determinations.—*M. M. Brooks.*

1409. PRIESTLEY, J. H., and DOROTHY ARMSTEAD. Physiological studies in plant anatomy. II. The physiological relation of the surrounding tissue to the xylem and its contents. *New Phytol.* 21: 62-80. 1922.—“At any moment certain cells around the vascular strand and within the vascular cylinder have especially permeable protoplasts: in some cases these protoplasts would seem to be more readily permeable by acid or basic ions.” If in *Vicia Faba* weak solutions of acid dyes (acid green or light green F. S.) are drawn up the xylem vessel of the root, certain cells of the pericycle, especially those just opposite the protoxylem, will be stained. On the other hand, basic dyes (malachite green) will stain the protoplasts of cells immediately adjacent to the xylem.—Under suitable conditions exudation pressures can be exhibited by stems and leaves as well as by roots (*Helianthus*, *Syringa*, *Ribes*, and *Spiraea*). Failure to obtain evidence of exudation pressure in the leafy twigs of *Fuchsia* is due to leakage from the hydathodes at the ends of veins, since blocking these permits the development of the exudation pressure. “The solutes present in the xylem sap are both organic and inorganic. As the organic solutes fell off in quantity in the sap rising from a cut vine [*Vitis*], the exudation pressure began to fail whilst the supply of inorganic solutes still remained approximately constant. Organic solutes would thus seem to be more directly responsible for the osmotic pressure effective in causing the flow of sap.”—Hydathode water of *Colocasia antiquorum* (Schott) is practically free from solute, probably due both to physical adsorption and to physiological absorption during the upward passage of the sap. The author observed such change in concentration of a fluid after it had been drawn through the stem of *Platanus*, *Ulmus*, *Syringa*, *Aesculus*, and *Acer*.—“The conception is developed of an equilibrium concentration for a sugar solution which would neither lose nor gain sugar during its passage through the xylem. This equilibrium concentration would vary in the same plant at different seasons,” being highest when the leaf buds are bursting.—*I. F. Lewis*

1410. REICHEL, H. Zur Wasser- und Ionenverteilung im Organismus. [Water and ion distribution in the organism.] *Biochem. Zeitschr.* 127: 322-326. 1922.—This is a critique and discussion of the physico-chemical aspects of the subject, with an account of an experiment with horse serum, tending to show that the change in indicator color (methyl orange) in acid protein solutions effected by addition of neutral salts does not controvert the idea that the colloid phase of the cell contents is salt-free and poor in  $H_2O$ , but that proper interpretation supports that view.—*W. W. Bonns.*

1411. STILES, WALTER. Permeability. *New Phytol.* 20: 137-149, 185-194. *Fig. 3.* 1921; 21: 1-14, 49-57, 140-162. *Fig. 4-6.* 1922.—Among the matters treated in Chapter 4 are: the



laws of diffusion, with equations for determining diffusion coefficients; methods used; a brief table of coefficients of diffusion of electrolytes and non-electrolytes; their relation to electrical conductivity and to molecular size; the influence of concentration and of temperature; and diffusion in heterogeneous systems and through colloids.—Chapter 5 is devoted to the permeability of non-living membranes. Differential permeability is discussed in some detail, along with the theories to account for the facts.—Chapter 6 deals with osmotic pressure: its determination, relation to temperature and concentration and measured values in sucrose; electrolytes and colloids; theories of osmotic pressure; and negative osmosis and its explanation.—Chapter 7 deals with the structure and composition of the cell wall, and with semi-permeable cell walls.—Chapter 8 is devoted to the plasma membrane. The 5 lines of evidence for its existence are considered: the physical laws of surfaces, cytological observations, the water relations of the cell, selective permeability and allied phenomena, and electrical conductivity. The composition of the limiting protoplasmic layer and the thickness of the plasma membrane also receive attention. Other cell membranes are mentioned.—*I. F. Lewis.*

1412. VERZAR, F., und R. BECK. Die Änderung der Aussalzbarekeit von Bakterien der Typhusgruppe durch verschiedene Verhältnisse. [The salting out of bacteria of the typhus group as affected by various means.] *Biochem. Zeitschr.* 107: 81-97. 1920.—Cultivation of bacteria of the typhus and para-typhus groups in agglutinin-containing bouillon failed to induce a spontaneously agglutinating type or to increase the sensitivity to sodium chloride or ammonium sulphate. Only a decrease in agglutinability resulted from cultivation in immune serum, the decrease being less in concentrated than in dilute serum for typhus bacilli, but considerable in the case of para-typhus B bacilli grown in concentrated serum. A manifold difference was shown between salting out by ammonium sulphate and agglutination by specific agglutinins.—*H. D. Hooker, Jr.*

1413. WINSLOW, C. E. A., and I. S. FALK. Studies on salt action. IV. The mutual influence of acidity and salt concentration upon bacteria. *Proc. Soc. Exp. Biol. and Med.* 19: 311-314. 1922.—In adjusting the H-ion concentration of 1.0 isotonic  $\text{CaCl}_2$  solution and 5.0 isotonic  $\text{NaCl}$  solution it was found that neither  $\text{CaCl}_2$  nor  $\text{NaCl}$  was toxic to *Bact. communis* between pH 5.0 and 7.0.—*M. M. Brooks.*

1414. ZSIGMONDY, R. Ueber "Lösungstheorie" und "Suspensions-theorie." [Concerning the "solution" and the "suspension" theories.] *Kolloid Zeitschr.* 26: 1-10. 1920.—This is a discussion of the grounds for the distinction between "solution" and "suspension" as used in colloid chemistry. Neither word can be dropped and neither tells the whole story. Crystalloidal and colloidal solutions or suspensions are parts of a common group; to use only 1 word for both would be like saying, "Green is red but of shorter wave length."—*H. E. Pulling.*

#### WATER RELATIONS

1415. GORTNER, ROSS AIKEN, and WALTER F. HOFFMAN. A rapid method for the determination of the moisture content of expressed plant-tissue fluids. *Proc. Soc. Exp. Biol. and Med.* 19: 355. 1922.—The moisture content of expressed plant saps can be measured by determining the refractive index of the sap, using an Abbé refractometer provided with a special "sugar scale." The method is accurate and rapid.—*M. M. Brooks.*

1416. MANGHAM, SYDNEY. Transport of organic substances in plants. *Nature* 109: 476-477. 1922.—The author protests the summary dismissal of transportation by bast, as suggested by Dixon and Ball [see Bot. Absts. 11, Entry 4633]. Citations of various papers and experiments are included.—*O. A. Stevens.*

1417. MENDIOLA, N. B. Effect of different rates of transpiration on the dry weight and ash content of the tobacco plant. *Philippine Jour. Sci.* 20: 639-655. 1922.—The study of plants grown in water culture shows that there is no absolute correlation between the percentage of ash, the relative rates of transpiration, and the total dry matter.—*E. D. Merrill.*

## MINERAL NUTRIENTS

1418. ARMSTRONG, GEORGE M. Studies in the physiology of the fungi. XIV. Sulphur nutrition: the use of thiosulphate as influenced by hydrogen-ion concentration. Ann. Missouri Bot. Gard. 8: 237-281. Fig. 1-21. 1921.—*Aspergillus niger*, *Penicillium glaucum*, and *Botrytis cinerea* have been shown to utilize the following chemicals as sources of sulphur;  $\text{MgSO}_4$ ,  $\text{Na}_2\text{S}_2\text{O}_3$ ,  $\text{MnSO}_4$ ,  $\text{KSH}$ ,  $\text{KHSO}_3$ ,  $\text{K}_2\text{S}_2\text{O}_5$ ,  $\text{KCNS}$ , and  $\text{NH}_4\text{CNS}$ . Some growth was evidenced with  $\text{K}_2\text{S}$ . The production of  $\text{H}_2\text{S}$ , occurring except where  $\text{MnSO}_4$ ,  $\text{MgSO}_4$ , and  $\text{K}_2\text{S}_2\text{O}_5$  were used, seems not related directly to active acidity strength of the solution or relative degree of growth. The action of the fungi on  $\text{Na}_2\text{S}_2\text{O}_3$  produces sulphates in the culture solution. Other forms of sulphur as end-products are  $\text{H}_2\text{S}$ , molecular sulphur, tetrathionate, and globules of sulphur sometimes found in the hyphae.—For cultures of *Aspergillus niger*, *Penicillium cyclopium*, and *Botrytis cinerea*, the ratio of thiosulphate decomposition to growth is not constant, although for some fungi this is true. Active acidity does not appear to influence the utilization of sulphur from thiosulphate.—In a modified Pfeffer's solution the reaction reverses for *Aspergillus niger* when the sugar disappears, while *Penicillium cyclopium* may cause a reversal of the reaction with sugar present in the solution. Since it has been established that reversal of the reaction may occur, it is clear that the true course of the changes which have occurred may not be obtained merely by a determination of the initial and final H-ion concentration of the fungous cultures.—S. M. Zeller.

1419. GARNER, W. W., J. E. McMURTREY, and E. C. MOSS. Sand drown, a chlorosis of tobacco and other plants resulting from magnesium deficiency. Science 56: 341-342. 1922.—This chlorosis attacks plants on sandy soil in wet seasons. Field and laboratory study has shown it to be due to lack of magnesium and it is aggravated by the presence of much sulphur. The leaf is blanched as a whole. Tests seem to show the importance of proper fertilizers but only 50 pounds of magnesium are actually needed per acre.—C. J. Lyon.

1420. GUILLAUMIN. Quelques expériences sur la fertilisation préalable des semences. [Some experiments on the preliminary fertilization of seeds.] Rev. Gén. Bot. 34: 257-263. 1922.—Experiments were made with barley and radish seed, dipping them for varying lengths of time in water and in solutions of ammonium nitrate and peptonate of gelatin. Dipping in water favored and hastened germination. The effect of dipping seed in fertilizing solutions differs with the plant used and the strength of solution employed. With 4 per cent solutions of nitrate of ammonia germination of radish seed was injured if the dip lasted 1 hour or longer. With 4 per cent peptonate of gelatin no appreciable effect was observed for the same durations of dipping.—With very weak solutions of nitrate of ammonia, germination was hastened and the yield of radishes was increased following short durations of dipping.—The peptonate of gelatin hastened the germination of barley noticeably, but it lowered the yield of radishes even with a very short interval of dipping, although increasing the production of chlorophyll.—J. C. Gilman.

1421. MAQUENNE, L., et E. DEMOUSSY. Influence des matières minérales sur la germination. [The influence of mineral materials on germination.] Ann. Sci. Agron. Française et Étrangère 38: 113-151. 1921.—Claiming that the distilled water and cultural media, such as paper, cotton, moss, ordinarily used by plant physiologists contain sufficient mineral matter to render invalid experiments as delicate as those herein reported, the authors describe their own technique. The water was twice distilled from Jena glass fitted with a quartz condenser, and kept in vessels of quartz or platinum; as media purified quartz sand and quartz tubes were used. The experiments were as follows: (1) The influence of 12 salts, used singly on germination of peas. These included the sulphates and chlorides of the alkali metals, the alkaline earth metals, also zinc, manganese, aluminum, lead, and copper. Calcium sulphate was most beneficial and copper sulphate most toxic. (2) The effect of different metals in the presence of calcium. The results show that the favorable action of calcium is considerably weakened by the presence of another salt. (3) The influence of acids on the germination of peas and wheat. Up to a concentration of 0.5 mgm. per 10 cc. the acids were favorable; be-

yond that, unfavorable. (4) The influence of salts of iron on germination. Ordinary ferrous sulphate or ferroso-ammonium sulphate was used as the ferrous, and ammonium iron alum as the ferric salt. In 1 experiment colloidal ferric oxide, prepared by dialysis of the chloride, was used. It was found that ferrous salts are much more toxic than either the ferric salts or colloidal ferric oxide, the latter giving slightly better growth than the ferric salt. Calcium sulphate was antitoxic to ferrous salts and, reciprocally, ferrous sulphate decreased the beneficial effect of calcium sulphate.—Extensive experiments with copper sulphate are reported. Employing a very sensitive colorimetric method, copper was found to be present in a great number of soil samples of diverse origin, arable soils containing ordinarily not more than 10 mgm. per kgm; soils from vineyards ran exceptionally high, some as much as 200–300 kgm. of metallic copper per hectare,—12–14 cm. deep,—these excessive amounts being due to long continued use of copper fungicides. Practical experience shows that this large amount is not toxic but, on the contrary, is probably antitoxic.—Copper was also found to be present in various parts of all of a number of species of plants examined; and since it prevails especially in parts of greatest growth activity it is considered indispensable to protoplasm.—With peas  $\text{CaSO}_4$  is antitoxic for  $\text{CuSO}_4$  and the latter antitoxic for iron salts. The last mentioned result is ascribed to the oxidative (catalytic) action of copper, since infinitesimal amounts sufficed to accelerate the oxidation of iron and render it insoluble or colloidal.—A. B. Beaumont.

1422. MEVIUS, WALTER. Beiträge zur Physiologie "kalkfeindlicher" Gewächse. [The physiology of calciphobous plants.] Jahrb. Wiss. Bot. 60: 147–183. 1921.—No harmful effects due directly to calcium were noted upon the growth of *Sphagnum rufescens*, *S. fimbriatum*, *S. imbricatum*, and *S. quinquefolium*.  $\text{CaCO}_3$  caused injury and death of *Sphagnum* because of its alkaline reaction. When the free alkali is neutralized no such injury occurs. Phosphates caused injury, but their poisonous action could be corrected by  $\text{KNO}_3$  and  $\text{MgSO}_4$ . Calcium was found to be unquestionably necessary for the growth of *Pinus Pinaster* and *Sarothamnus scoparius*; the lack of calcium caused the roots of the latter to rot, and it resulted in shoot-tip injury to the former. The behavior of both these plants toward OH ions was similar to that of *Sphagnum*. In strong concentrations these ions caused a great decrease in growth and a destruction of roots in both plants. Weak concentrations caused chlorosis. The concentrations causing definite injury were different for each species.—A bibliography of 62 titles is appended.—Earl S. Johnston.

1423. MUENSCHER, WALTER C. The effect of transpiration on the absorption of salts by plants. Amer. Jour. Bot. 9: 311–329. 1922.—Previous work on this subject is outlined and the many contradictory results and conclusions noted. The author studied transpiration in a pure line of barley, grown in Knop's solution in a greenhouse, one series of experiments being conducted in the summer and another in the winter. Cultures were grown for 5 weeks, the solution being changed every 5th day. Green weight, dry weight, and ash weight for tops and roots were determined. In the summer series the rate of transpiration was modified by changing humidity and light, plants being grown under 4 conditions, namely, in a dry chamber, in a humid chamber, in the sunlight, and under a shade tent. In the winter series, transpiration was modified by shading and by changing the concentration of the solution, plants being grown under 3 conditions, as follows: in sunlight in dilute solution, under a shade tent in dilute solution, and in sunlight in concentrated solution. When transpiration was reduced to less than half by increasing humidity, total ash content of plants remained essentially the same. Shading reduced transpiration but reduced photosynthetic activity also, and therefore total ash content. Increased concentration of nutrient solution reduced transpiration markedly but ash content hardly at all. The ash content expressed in percentage of total dry weight of the whole plants varied but slightly, regardless of whether the plants were grown under conditions of high or of low transpiration and irrespective of how transpiration was reduced. These results show that there is little or no relation between transpiration and absorption of salts in barley and they do not support the theory that transpiration plays an important rôle in supplying the plant with nutrient salts. The amount of growth seems to be an important factor in determining the amount and rate of entrance of essential salts taken up.—E. W. Sinnott.



1424. TRUOG, E. The feeding power of plants. *Science* 56: 294-298. 1922.—It has been proved that roots do not make mineral nutrients available primarily by acid excretion nor by the acid condition of the root hairs in contact with the soil. If 2 soluble products are formed by the excreted carbonic acid, the utilization is dependent upon the removal of these products. Plants with a high calcium content utilize rock phosphate because they remove the phosphate and calcium bicarbonate. Similar explanations may be given for the use of calcium, potassium, and base-forming elements, such use being related to sap acidity.—C. J. Lyon.

1425. WESTER, D. H. Over het manganeghalte von bloemen. [The manganese content of flowers.] *Pharm. Weekblad* 59: 51-55. 1922.—The flowers of 34 species of plants were examined and it was found that the moisture of the petals varies between 75.6 per cent in *Senecio Jacobaea* and 94.5 per cent in *Clivia*; generally 80-90 per cent of moisture is present. The smallest amount of ash was found in the petals of *Rhododendron* and the highest in the petals of chervil. The ash usually amounts to 1 per cent in the petals of flowers. All the flowers contained manganese, from 0.92 mgm. in 100 gm. of dry petals in *Weigelia* to 14.5 mgm. in *Melampyrum*. Expressed in mgm. of Mn in 100 gm. of ash the lowest amount, 11.2 mgm., was found in *Lamium* and the highest, 222.1 mgm., in *Centaurea*.—H. Engelhardt.

1426. WINSLOW, C. E. A., and MARGARET HOTCHKISS. Studies on salt action. V. The influence of various salts upon bacterial growth. *Proc. Soc. Exp. Biol. and Med.* 19: 314-315. 1922.—The effects of the addition of various salts to peptone solution containing *Bact. communis* were studied. It was found that there is a definitely stimulating action exerted by concentrations of salts below the inhibitive level.—M. M. Brooks.

1427. WRANGELL, M. VON. Gesetzmässigkeiten bei der Phosphorsäureernährung der Pflanze. [The laws governing the phosphorus nutrition of plants.] *Landw. Jahrb.* 57: 1-78. 1922.—As a result of a detailed study of the influence of phosphatic fertilizers on plant growth the author comes to the following conclusions: (1) Different plants do not utilize alike the difficultly soluble calcium phosphates. (2) The calcium-loving plants are able to utilize phosphoric acid from difficultly soluble calcium phosphates (raw phosphate, tricalcium phosphate) even when the reaction is weakly alkaline. The presence of moderate quantities of alkaline or physiologically alkaline calcium salts prevents appreciably the high calcium consumption of these plants, but not the utilization of the calcium phosphate. Other plants, particularly cereals, utilize difficultly soluble calcium phosphates only in the presence of acid manures, or when the soil reaction is acid. With manures reacting alkaline, and in the presence of lime, the acidity of the soil is diminished and the utilization of calcium phosphates ceases completely. (3) The ratio  $\text{CaO} : \text{P}_2\text{O}_5$  in the ash of these plant groups is distinctly different. In the cereals, the calcium-phosphoric acid factor (ratio of molecular  $\text{CaO} : \text{molecular P}_2\text{O}_5$ ) is, on the average, 1 to 3; in the calcium-loving plants (Cruciferae, beets, flax, buckwheat), the ratio is much larger, on the average 15. This factor indicates the ability of various plants to utilize difficultly soluble calcium phosphates. (4) The greater the calcium consumption of plants, the longer is the absorption of phosphoric acid from calcium phosphate prevented by the presence of calcium salts. Cereals containing normally, in the ash, less calcium in relation to  $\text{P}_2\text{O}_5$  than would correspond to the formula  $\text{Ca}_3(\text{PO}_4)_2$ , can utilize the latter only in the absence of other calcium salts. In the presence of 1 molecule of  $\text{CaCO}_3$  for 1 molecule  $\text{Ca}_3(\text{PO}_4)_2$ , the yield of oats diminished to  $\frac{1}{2}$ ; with 2 molecules  $\text{CaCO}_3$ , to  $\frac{1}{3}$ ; in the presence of 5 molecules of  $\text{CaCO}_3$ , the  $\text{Ca}_3(\text{PO}_4)_2$  was not utilized at all. This drop in the utilization of  $\text{Ca}_3(\text{PO}_4)_2$  by increasing the amount of  $\text{CaCO}_3$ , was much slower in the case of buckwheat. Only in the presence of 600 molecules of  $\text{CaCO}_3$  had the calcium-phosphoric acid ratio reached a maximum, and the action of  $\text{Ca}_3(\text{PO}_4)_2$  ceased completely. The ability of plants to assimilate calcium is in a way a measure of the calcium-phosphoric acid factor. (5) In the presence of pure  $\text{Ca}_3(\text{PO}_4)_2$  in neutral, calcium-free sand, white mustard will suffer from lack of calcium, while corn will suffer from lack of phosphoric acid, as seen from the ash analyses. White mustard gives, under these conditions, a relatively high  $\text{P}_2\text{O}_5$  content with a low calcium content (factor 7 instead of the normal factor 15). Corn shows a low  $\text{P}_2\text{O}_5$  and a high Ca content (factor 16

in comparison with the normal 3). The calcium-phosphoric acid factor can serve as an index of the conditions under which plant nutrition takes place, giving information on the soil reaction,  $\text{Ca}:\text{P}_2\text{O}_5$  ratio in the soil, degree of activity of these substances, etc. (6) Pot experiments as well as practical field conditions may in some cases show a lack in a certain nutrient, while the soil itself may actually not need this nutrient. This may be due to the other fertilizers used, soil reaction, and presence of an abundance of lime. (7) The sensitiveness of lupines towards calcium can be overcome by an excess of  $\text{P}_2\text{O}_5$  fertilization. (8) In general an acid reaction in the soil favors an anion assimilation, while an alkaline reaction favors an assimilation of cations. (9) In the presence of soluble phosphates, particularly acid phosphates, there is abundant development of the green flagellated alga *Haematococcus pluvialis*, on the surface of the sand; in the absence of  $\text{P}_2\text{O}_5$ , there is a development of the red palmella form of the same species; in the presence of difficultly soluble phosphates with reaction acid, or  $\text{CaHPO}_4$  with reaction alkaline, both the red and green forms or mixed forms develop side by side. (10) The utilization of tertiary aluminum and iron phosphates by different plants is not dependent on the presence of calcium and its action. These phosphates are utilized relatively well, specially magnesium phosphate. (11) The question of the kind of base in phosphatic fertilizers is important. The utilization of the phosphates Ca, Al, Fe, and Mg depends on the preference of the individual plants for the corresponding base.—*Selman A. Waksman*.

### PHOTOSYNTHESIS

1428. BALLY, E. C. C. **Photosynthesis.** *Nature* 109: 344-346. 1922.—All chemical reactions are considered to take place in 3 stages: (1) changing the molecules from an inactive state into the reactive condition, either by a catalyst or by absorption of radiant energy; (2) the actual atomic rearrangements by which the new compounds are formed; (3) the changing of the resulting molecules into the normal inactive state. The energy used in stage 1 may be greater than that evolved in 2 and 3 (endothermic reaction) or less (exothermic reaction). Highly endothermic reactions, such as the production of formaldehyde from carbon dioxide and water, require so much energy that as a practical laboratory method heat energy cannot be used, while ultra-violet light of 200 micromillimeters wave length can be. Basic dye stuffs, as malachite green, methyl orange, or *p*-nitrosodimethylaniline, in a solution of carbon dioxide will act in ordinary daylight as photocatalysts in producing formaldehyde; and chlorophyll in plants seems to act in this manner. The formaldehyde thus produced, being in a reactive condition, does not require added energy to activate it; and since it has been shown that formaldehyde in this condition will polymerise to a reducing sugar, it is believed that this accounts for sugar production in leaves and the lack of free formaldehyde. As for the oxygen, "it is in the highest degree probable that a molecule of chlorophyll *a* combines with a molecule of carbonic acid, and this complex on exposure to light gives a molecule of activated formaldehyde and a molecule of chlorophyll *b*, which by another mechanism in the leaf is changed back to the *a* form, thus releasing a molecule of oxygen. It is further "suggested that carotin has the power of reducing chlorophyll *b* to chlorophyll *a*, being itself oxidized to xanthophyll," since the ratio of xanthophyll to carotin increases during photosynthesis. The 2 latter pigments may absorb sufficient energy to cause the evolution of oxygen. The sugars produced from activated formaldehyde are all hexoses which thus seem to be the starting point for the synthesis of other plant products. Further, activated formaldehyde will combine with potassium nitrate or nitrite in aqueous solution in ultra-violet light, and when in excess both sugars and the form-hydroxamic acid are formed independently. This is suggested as the condition in plants. Ammonia also combines readily with activated formaldehyde. "Finally, one very important deduction may be made. The sole photosynthetic process in the living plant would seem to be the production of activated formaldehyde from carbon dioxide and water" and all other processes are essentially polymerisations or chemical syntheses.—*Ernest Shaw Reynolds*.

1429. BALLY, E. C. C., I. M. HEILBRON, and D. P. HUDSON. **Photocatalysis. Part II.** The photosynthesis of nitrogen compounds from nitrates and carbon dioxide. *Jour. Chem. Soc. [London]* 121: 1078-1088. 1922.—This is a discussion of the formation of the complex nitrogen

derivatives in plants, based on experiments in which nitrogen compounds were synthesized *in vitro* from carbon dioxide and potassium nitrate. The activated formaldehyde, photocatalytically formed in leaves from carbonic acid through the agency of chlorophyll, reacts with potassium nitrite to produce form-hydroxamic acid, the 1st step in the synthesis of nitrogen compounds in plant tissue. Form-hydroxamic acid reacts with additional activated formaldehyde producing more complex nitrogen-containing substances known to occur in plants, e.g., amino-acids, alkaloids, etc. Any excess of activated formaldehyde condenses to hexoses (but not to pentoses). In these various nitrogen reactions oxygen is evolved. It is believed that nitrogen synthesis takes place exclusively in leaves, and that the products are transported as soluble glucosides. These results explain the observations of Schimper [Bot. Zeitg. 46: 65. 1888] to the effect that nitrites are always present in the leaf in the dark and that they disappear when the leaf is exposed to light. The activated formaldehyde formed in the light reacts with the nitrites, forming other nitrogen compounds. It is suggested that catalase is involved in the reduction of nitrate to nitrite. Readiness of reaction in these syntheses is explained by the highly activated condition of the compounds. "The key to the problem is the enhanced reactivity of freshly synthesized molecules."—F. E. Denny.

1430. WARBURG, O. Über die Geschwindigkeit der photochemischen Kohlensäureversetzung in lebenden Zellen. II. [The velocity of the photochemical decomposition of carbon dioxide in living cells.] Biochem. Zeitschr. 103: 188-217. Fig. 1-3. 1920.—When a dark-adapted green cell was illuminated at low intensity, no photochemical induction was detected; when illuminated at high intensity, the velocity of carbon assimilation increased in a few minutes to a constant end value. When a light-adapted cell was darkened, assimilatory activity diminished gradually and dark equilibrium was reached in 5 minutes. Narcotics affected carbon assimilation at low concentrations of CO<sub>2</sub> in the same manner as at high concentrations. Hydrogen cyanide retarded the photochemical cleavage of oxygen from CO<sub>2</sub> but not from intermediary products of respiration. Assimilation is thought to consist of 3 photochemical processes. The primary reaction affects chlorophyll but does not lead to the formation of oxygen. Another is the formation of acceptors from carbon dioxide, an irreversible reaction retarded by small amounts of hydrogen cyanide. Finally, the products of the 1st reaction react with the acceptors, a reaction not affected by hydrogen cyanide. Experiments on the photochemical reduction of nitrate in the absence of CO<sub>2</sub> failed to show whether the nitric acid was reduced directly or whether it reacted with cell constituents and the oxygen was produced in the same manner as during assimilation.—H. D. Hooker, Jr.

### METABOLISM (GENERAL)

1431. ARNOLD, W. Zur Bestimmung von Fettsäuren auf Grund ihrer Flüchtigkeit mit Wasserdämpfen. [Estimation of fatty acids by means of their volatility with steam.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 42: 345-372. 1921.

1432. BELL, MARION, and LAFAYETTE B. MENDEL. The distribution of vitamin-B in the wheat kernel. Proc. Soc. Exp. Biol. and Med. 19: 395. 1922.—Various percentages of wheat and wheat derivatives were fed to mice. From 14 to 40 per cent of the entire wheat kernel as a source of vitamin-B was required to insure normal rate of growth. Various parts of the grain itself were analyzed for the presence of vitamin-B.—M. M. Brooks.

1433. CIAMICIAN, G., and A. GALEZZI. Sul contegno di alcune sostanze organiche nei vegetali. [Upon the behavior of some organic compounds in plants.] Gazz. Chim. Ital. 52: 3-20. 1922.—The paper is divided into 3 parts: I. The attack of uric, dimethyluric, salicylic, *m*-cresylic, tetra-hydrophthalic, carbopyrrolic, di-methyl-pyrrol-di-carbonic, phthalic acids, methyl salicylate,  $\alpha$ -naphthylamine, pyridine, quinoline, urea, guanidine, eugenol, vanyl-line of benzilic acid and alcohol by the pulp of *Spinacia oleracea* in oxygen and toluol. II. A study of the attack of glucosides by the leaves of the cherry laurel and *Spinacia*. The following substances were studied: amygdaline, salicine, saligenine, tannin, and pyrogallol.



III. A study of the effect of xanthine, theobromine, caffeine, compound esters (diethyl oxalate and succinate vs. the K salts), monovalent alcohols (methyl, ethyl, propyl, isopropyl, isobutyl, isoamyl) aldehydes (formic, acetic, and propionic), ketones, and oxyacids upon the growing plant of *Phaseolus*. The technique has been previously described. [See also Bot. Absts. 5, Entry 2240; 6, Entry 1317; 7, Entries 2133, 2134; 10, Entries 1341, 1342, 1361.]—*A. Bonazzi*.

1434. COLIN, H. L'inuline dans les plantes greffées. La greffe soleil annuel-Topinambour. [Inulin in grafted plants. The sunflower-artichoke graft.] Rev. Gén. Bot. 34: 145-155, 202-213. 1922.—The graft of sunflower (*Helianthus annuus*) and artichoke (*Helianthus tuberosus*) was studied with particular regard to chemical characteristics of the sap of the grafted plants. The carbohydrates of the sunflower are saccharose and the reducing sugars, chiefly glucose; those of the artichoke are inulin and its derivatives. From chemical analyses of both autonomous plants and of grafts of sunflower on artichoke and vice-versa the author concludes that the different plants making up the graft maintain their individual identities and do not fuse either physiologically or morphologically.—*J. C. Gilman*.

1435. DEUSSEN, E. Die Gramsche Bakterienfärbung, ihr Wesen und ihre Bedeutung. [The nature and significance of Gram staining.] Biochem. Zeitschr. 103: 123-141. 1920.—The effect of various acids at different temperatures in rendering Gram-positive yeast Gram-negative was determined. This change, which was in proportion to the degree of dissociation of the acid, is attributed to an alteration of the cell contents. It is suggested that the tendency of acids and neutral salts to reduce and eventually to stop the fermentation of sugar by yeast may be attributed to protein precipitation within the cells. A similar effect is surmised to be produced in *Staphylococcus aureus*.—*H. D. Hooker, Jr.*

1436. ELIAS, H., und S. WEISS. Über die Rolle der Säure im Kohlenhydratstoffwechsel. V. Säure und Alkali in ihrer Wirkung auf den Kohlenhydratstoffwechsel der Hefezelle. [The rôle of acids in carbohydrate metabolism. V. The action of acids and alkalis upon the carbohydrate metabolism of the yeast cell.] Biochem. Zeitschr. 127: 1-12. 1922.—As a means of interpreting previous experiments on glycogen formation in liver, the writers have studied the effect of acid and alkaline solutions on the content of this carbohydrate in yeast. Methods are briefly described. The quantitative sugar data were obtained after hydrolysis by the Bertrand method. Acid solutions showed no consistent effect upon glycogen content. In alkaline solution, however, a definite increase in glycogen content was correlated with increased solution concentration up to  $\frac{N}{20}$  NaOH. At greater concentrations (up to  $\frac{N}{5}$ ) there was increase in total glycogen, most of which was present in the surrounding solution. An increase in total carbohydrate content is ground for the conclusion, supported by nitrogen determinations ("Rest" N), that increase in glycogen does not result from conversion of existing sugars, but from the clearance products of proteolysis.—*W. W. Bonns*.

1437. IRVINE, JAMES COLQUHON, ETTIE STEWART STEELE, and MARY ISOBEL SHANNON. The constitution of polysaccharides. Part IV. Inulin. Jour. Chem. Soc. [London] 121: 1060-1078. 1922.

1438. KENNEDY, CORNELIA, and LEROY S. PALMER. Yeast as a source of vitamine-B for the growth of rats. Proc. Soc. Exp. Biol. and Med. 19: 362-364. 1922.—Yeast was found to be a variable source of vitamin-B for growth when fed to rats because it was produced under various conditions. The results do not support the general belief that yeast is an unusually rich source of vitamin-B for growth.—*M. M. Brooks*.

1439. LOEWE, S. Zur physikalischen Chemie der "Lipoide." Die Durchwanderung von Methylenblau durch organische Lösungen. [The physical chemistry of lipoids. The diffusion of methylene blue through organic solutions.] Biochem. Zeitschr. 127: 231-240. Fig. 1. 1922.

1440. MACDOUGAL, D. T. **The probable action of lipoids in growth.** *Proc. Amer. Phil. Soc.* 61: 33-52. *Fig. 1.* 1922.—Experiments performed are for the consideration of lipoids as a fundamental structure of protoplasm and the primary factor in all exchanges between the cell and the medium. Measurements of endosmose in artificial cells with a plasmatic lining including lipoids were made. The porosity of the clay walls was first determined in various ways and then the absorption capacity of lining layers of various mixtures of biocolloids measured when under the influence of salts, saponin, and soaps. Lecithin incorporated in the plasmatic jelly layer of the cell had little effect on the osmotic action, but when deposited as a layer between the plasmatic jelly and the outer wall it lessened the permeability and increased the osmotic effect. The use of saponin or solutions which liquefy or displace lecithin in the cell contents or external layer increased permeability by increasing hydration, and lessened osmotic action. The hydration reactions of living and dead cell masses in the solutions used in the osmotic tests showed a similar influence on the wall of the plant cell. Variations in thickness indicative of changes in turgidity of cell masses subjected to neutral salts and other solutions were registered by means of the auxograph.—*Wanda Weniger.*

1441. MOREAU, M. et MME. FERNAND. **Étude des phénomènes sécrétoires dans les glandes à lupuline chez le houblon cultivé.** [Study of the secretion of lupulin by the glands of cultivated hops.] *Rev. Gén. Bot.* 34: 193-201. *Pl. 9-10.* 1922.—During the development of the lupulin-glands, 3 groups of substances may be recognized in the cells: lipoids, tannoids, and the essences and resins. A special procedure was used in the case of the lipoids due to their solubility in alcohol, benzine, toluene, xylol, or other substances used in fixation and imbedding. During the growth of the gland the lipoids were observed in the cytoplasm in the form of granules and filaments, present from the beginning, becoming more and more abundant up to the time of the spreading of the disk and cup, then diminishing in quantity in the later stages. The tannoids on the other hand occur in the vacuoles. They are present in solution in the young stages, then appear as threads or a network, later becoming more voluminous, and they persist even in the older glands. The essences and resins were not found in the young glands, which were rich in lipoids but they became abundant in the later cup stage. These products are present in the cytoplasm between the vacuoles containing the tannoids or around the large tanniferous central vacuole, always as globules larger than the granular lipid bodies. Because of these associations the authors are inclined to consider that the essences and resins are elaborated from the lipoids or, if the relation is not so close as this, at least the lipoids react with the protoplasm to modify permeability so as to allow the passage of the essences and resins into the subcuticular cavity of the gland.—*J. C. Gilman.*

1442. NEUBERG, C. **Weitere Erfahrungen über die Bildung und Bedeutung der Fructose-diphosphorsäure im Stoffwechsel der Hefe.** [The formation and significance of fructose-diphosphoric acid in yeast metabolism.] *Biochem. Zeitschr.* 103: 320-335. 1920.—Since fresh bottom yeast in the presence of toluol contains no hexose diphosphate, while the same yeast when dried contains it, this compound appears, in a sense, as a pathological product of yeast metabolism. It is not considered essential to the process of fermentation, as sugar was decomposed without any indication of esterification.—*H. D. Hooker, Jr.*

1443. NORD, F. F. **Phytochemische Reduktion von o-Nitrobenzaldehyd.** [Phytochemical reduction of o-nitrobenzaldehyde.] *Biochem. Zeitschr.* 103: 315-319. 1920.—The action of yeast cells on ortho-nitrobenzaldehyde results in the recovery of only 10 per cent as ortho-nitro-benzylalcohol. Other reaction products are present. The phytochemical reduction of the aldehyde groups is evidently easier than that of the nitro group.—*H. D. Hooker, Jr.*

1444. PATSCHOVSKY, NORBERT. **Studien über Nachweis und Lokalisierung, Verbreitung und Bedeutung der Oxalsäure im Pflanzenorganismus.** [Identification and location, distribution and significance of oxalic acid in the plant.] *Dissertation.* 126 p. Jena, 1918.

1445. ROSE, MARY SWARTZ, AND GRACE MACLEOD. **The almond as a source of the A vitamin.** *Proc. Soc. Exp. Biol. and Med.* 19: 391-393. 1922.—When 3 per cent almond mixture

was added to the basal diet of rats, their weight increased. This shows that almonds seem to be fairly rich in fat-soluble A vitamin. Larger quantities produce unfavorable effects on growth.—*M. M. Brooks.*

1446. SAHA, HARIDAS, AND KUMUD NATH CHOUDHURY. **Capsularin, a glucoside from jute leaf.** Jour. Chem. Soc. [London] 121: 1044-1046. 1922.—The glucoside capsularin was isolated from the leaves of the jute (*Corchorus capsularis*) and was found to differ from the glucoside corchorin present in the seed of the same plant. A purified, crystalline product was obtained. On hydrolysis *d*- and *l*-glucose were split off, but the identity of the second product of hydrolysis was not established.—*F. E. Denny.*

1447. WILLAMAN, J. J., AND R. M. WEST. **Correlations among the constituents of potato tubers.** Proc. Soc. Exp. Biol. and Med. 19: 360-362. 1922.—The protein and carbohydrate found in potato tubers are not correlated with the dry matter, but are correlated with each other negatively. The amount of ether extract found in tubers is insufficient to account for all the increase in dry matter. It is possible to improve the potato tuber as regards protein, provided the dry matter is increased, thereby maintaining the mealiness which is a desirable quality.—*M. M. Brooks.*

1448. WISLICENUS, H. **Die Kolloidchemie des Holzes, seiner Bestandteile und seiner Entstehung.** [The colloid chemistry of wood, its components and its formation.] Kolloid Zeitschr. 27: 209-223. 1920.—Ordinary chemistry, although showing the method by which even the large molecules of tannins, fats, and resins may be formed from the simpler photo-synthetic products, fails to explain lignification. Although cellulose is constant in composition, with the formula  $(C_6H_{10}O_5)_x$  ( $x$  being large) lignin has a carbon content varying from less than 52.5 to over 65.0 per cent; hydrogen ranges from 5.3 to 4.8 per cent; while oxygen and nitrogen together range from 30.2 to 42.2 per cent. Klason's formula  $(C_{40}H_{42}O_{11})$  really applies to an aromatic component of lignin. The stainable substances in lignified wood are not lignin. Lignin is the sum of all colloiddally dissolved hydrosols of high molecular weight that are deposited from the formative or cambial sap upon the surface of cellulose fibers. Anatomical variability of tissues and vessels of woody plants is not very great and depends upon differences in surface structure, i. e., upon the variability of lignin, and on it also depend the properties, density, etc., of wood.—The author's hypothesis involves many considerations, thus (1) an increasing complexity of sap compounds as the leaf activity proceeds, also the transportation and concentration of these in the older cells as oxidation and condensation products; (2) the ascending transpiration stream, laden with salts, etc., meeting the stream of assimilate and inducing coagulations and other colloid chemical effects; and (3) the indifferent hydrosols being coagulated by the multivalent ions, the acid substances with high molecular weight forming alkali salts and thus acquiring greater dispersion and dissemination.—The author then used cambial sap and spring root sap in testing for strongly dispersed, weakly adsorbing substances and for those that were but slightly dispersed and were strongly adsorbent. The inner bark was peeled off with glass or porcelain and put at once into distilled water to prevent discoloration through oxidation. This was filtered and quantitative studies on adsorption were undertaken. Spring bleeding sap contains but little colloid at the beginning and from March to the end of sap flow (near May 1) shows only a slight increase—to 4.5-8.5 per cent. The hornbeam, which forms especially heavily lignified wood, had 21 per cent by May. The cambial sap from the beginning of leaf activity was, however, very rich in colloids. In May June, and July the percentage of colloids was from 30 to 40 per cent. About the beginning of August it drops to its low point, 6.5-8.0 per cent, or about the amount in bleeding sap. About this time secondary thickening ceases and the cortex dries. At the time of maximum wood formation the colloid content of the leaf sap is the highest. When wood formation is at its minimum, the colloid content is likewise.—The pure chemistry is not clear. The chief possibilities are: (1) normal polymerization and addition by main valences; (2) molecular complex formation by sub or latent valences; (3) ordinary condensation; (4) autooxidation with following condensation; (5) independent syntheses and transformations. Examples of these various



classes are discussed from the standpoint of the application to lignification. It is possible to form a cellulose hydrosol by grinding cellulose fibers in water for a long time; upon standing this sol stiffens to a jelly. The similarity of fibrous clay in structure and in adsorption behavior to animal and plant fibers is pointed out and illustrated by photomicrographs. After its deposition various adsorptive changes take place in lignin and these are followed by slow chemical transformations and greater concentration of molecules, especially of the carbinol groups of the saccharide polyalcohols. This leads to aging, and with drying, the mass becomes so resistant that few chemical reagents are able to affect it.—*H. E. Pulling.*

### METABOLISM (NITROGEN RELATIONS)

1449. FODOR, A. Studien über den Kolloidzustand der Proteine im Hefeauszug. 1. Hefesaftprotein in alkalischer Lösung. Beziehungen zu biologischen Vorgängen. [The colloidal condition of the proteins in expressed sap of yeast. 1. Yeast-sap protein in alkaline solution. The relation to biological processes.] *Kolloid Zeitschr.* 27: 58-69. 1920.—Because the enzymatic action is best in weakly alkaline solution and because there is an adsorption compound between the colloidal enzyme and its substrate, this research was undertaken as a basis for a theory of enzyme action in yeast. The ionic theory cannot explain the facts either of ferment action or of adsorption in these solutions without the help of dispersoid chemistry. The enzyme is the adsorbent to which the substrate is bound. The optimum concentration is the result of 2 opposing reactions of which one is an increase in the degree of dispersion through accumulation of OH ions, while the opposing action is produced by hydration of the enzyme particles, which thus decreases its power to adsorb substrate. The biologically active parts of peptolytic and tryptolytic enzyme systems are colloids in the state of heteroions that bear OH groups in a potential condition and which are not injured by extensive hydration and decrease in adsorbing power. Apparently the organism regulates the hydration by suitable acidity of the medium.—*H. E. Pulling.*

1450. GLÄSSNER, K. Eine neue Pepsinbestimmungsmethode. [A new method of pepsin determination.] *Biochem. Zeitschr.* 127: 312-315. 1922.—The method is based on the precipitation by dilute ammonia of globin in solution acidified by HCl.—*W. W. Bonns.*

1451. KNOWLTON, H. E. A preliminary experiment in half tree fertilization. *Proc. Amer. Soc. Hort. Sci.* 18: 148-149. 1921 [1922].—In an effort to obviate the factor of tree individuality an experiment was conducted whereby the root systems on one side of each of 25 Rome Beauty apple trees were fertilized with 5 pounds of nitrate of soda several weeks before blooming time and the other side of each left as control. At intervals after the application, samples of buds and leaves were taken from both sides of the tree. On the 5th and 8th days no noticeable differences were evident between the nitrogen content of the opening fruit buds on the 2 sides of the tree. On the 12th day the buds on the fertilized side showed 43.5 mgm. of nitrogen and on the unfertilized side 30.9 per gm. of dry weight. On the 21st day the corresponding analyses of leaves were 17.4 and 12.9 mgm. respectively. Analyses made in the fall showed no significant differences between the 2 sides. A study of terminal growths showed that limbs on the fertilized side received more nitrogen than did the unfertilized side.—*W. E. Whitehouse.*

1452. RAYNER, M. CHEVELEY. Nitrogen fixation in Ericaceae. *Bot. Gaz.* 73: 226-235. *Fig. 1-4.* 1922.—The author summarizes the investigations which furnish "cumulative evidence that the endophyte of Ericaceae can utilize atmospheric nitrogen in greater or less degree." Experimental evidence is given which supports the conclusions of Ternetz that the *Calluna-Phoma* symbiosis is an obligate one. The ericaceous plant in this instance to a significant degree obtains its nitrogen from the nitrogen-fixing fungus. This accounts for the "proved ability of a species such as *Calluna* and *Vaccinium* to thrive in soils deficient in nitrates."—*B. W. Wells.*

## METABOLISM (ENZYMES, FERMENTATION)

1453. BIEDERMANN, W. Über die Wirkung von Pepsin und Trypsin auf Diastase. [The effect of pepsin and trypsin on diastase.] *Biochem. Zeitschr.* 127: 38-46. 1922.—These are experiments dealing with animal diastase (salivary excretions) showing that pepsin inhibits diastatic activity while trypsin does not.—*W. W. Bonns.*

1454. BOAS, F. Über die Abhängigkeit von Hefewachstum und Hefengärung von physikalisch-chemischen Erscheinungen. [The dependence of yeast growth and fermentation on physico-chemical processes.] *Biochem. Zeitschr.* 105: 193-198. 1920.—The fermenting ability of bottom yeast in 15 per cent glucose solution to which ammonium sulphate was added varied with the concentration of the latter, there being 1 maximum and 2 minimum zones, and the rate of growth showed 2 maxima and 1 minimum. Analogous results were obtained when racemic leucine, asparagin, and peptone were used as sources of nitrogen, the details varying with the strain of yeast used, but with natural leucine the carbon dioxide evolved was proportional to the concentration. The phenomena are attributed to physico-chemical changes in the plasma membrane.—*H. D. Hooker, Jr.*

1455. BOAS, F., H. LANGKAMMERER, und H. LEBERLE. Untersuchungen über Säurebildung bei Pilzen und Hefen. IV. [Acid formation by molds and yeasts.] *Biochem. Zeitschr.* 105: 199-219. 1920.—Acid formation by yeast was favored by the sugars maltose, glucose, fructose, and sucrose in increasing intensity, or inversely as they favored growth and fermentation, acid development being zero with many yeasts in maltose and very great in sucrose. The specific action of the sugar may be altered somewhat by adaptation, by the concentration of nitrogen, or by the reaction of the solution. Sucrose was inverted, but only slowly fermented. The nature of the nitrogen supply was immaterial, though with maltose ammonium chloride stimulated growth and fermentation more than asparagin. The maximum acidity attained during fermentation of sucrose was pH 2.44. In whortleberry juice with sucrose and ammonium chloride added, a pH of 1.85 was reached during vigorous fermentation, without injury to the yeast.—*H. D. Hooker, Jr.*

1456. HÄGGLUND, E. Schweflige Säure und Hefegärung. [Sulfurous acid and yeast fermentation.] *Biochem. Zeitschr.* 103: 299-305. *Fig. 1-2.* 1920.—The toxic action of sulfurous acid on yeast fermentation is ascribed to the undissociated molecule. Sodium sulphite also retards fermentation while potassium sulphate stimulates it, increasing it 25 per cent in a 0.2N solution.—*H. D. Hooker, Jr.*

1457. HEPBURN, J. S., E. Q. ST. JOHN, F. M. JONES, and W. F. BOKER. Studies of the North American Sarraceniacae. *Jour. Biol. Chem.* 50: Proc. XLVI. 1922.—Liquor from closed pitchers of *Darlingtonia californica* contained diastase. Protease, maltase, emulsin, invertase, and urease were absent. Liquor from closed pitchers of *Sarracenia flava* contained invertase and lipase. Maltase, emulsin, diastase, urease, and esterase were absent. The liquor had a surface tension of 66.4 dynes per cm. Protease occurred in the fluid from closed pitchers of the Sarraceniacae. Liquor from closed pitchers was bacterially sterile, that from open pitchers contained proteolytic bacteria. The pitchers absorbed nutrient compounds from their cavities. The pitcher liquor from the Sarraceniacae produced permanent cessation of motion of ants and caused more of them to sink, and more promptly than in water. The rhizomes of the Sarraceniacae did not contain protease.—*G. B. Rigg.*

1458. LIPPMANN, E. O. VON. Über die sogenannte Methylalkoholgärung. [Methyl alcohol fermentation.] *Biochem. Zeitschr.* 106: 236-238. 1920.—The presence of methyl alcohol in fermented fruit juices is attributed to the hydrolysis of pectin, a methyl ester of pectic acid, and not to any process of fermentation.—*H. D. Hooker, Jr.*

1459. MERL, TH., und J. DAIMER. Studien über Mehlkatalase. [Studies of the catalases of flour.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 42: 273-290. 1921.—The behavior

of flour-catalase with trypsin is less conclusive in establishing that the former is of albuminous nature than is the case with animal catalases. A dried preparation of grain embryos (14 per cent of their original weight) possesses 5 times the catalytic power of the original material. The gas volumetric apparatus of Tillmans and Henblein was used for estimation of catalytic power. The optimum hydrogen-ion concentration extends from pH 6.2 to an alkaline reaction. The inhibitive action of acetic and lactic acids is weak. The optimum temperature is between 30 and 40°C., and the temperature coefficient of rapidity of decomposition is about 1.5. Relatively great resistance to dry heat, characteristically high susceptibility to moist heat, and a low resistance to high temperature in moist surroundings were demonstrated. In a comparison of inhibition by alcohol, benzol, chloroform, hydrocyanic acid, and toluol the last appeared least harmful.—*E. E. Stanford.*

1460. MORGULIS, S. The heat of enzyme reaction. A study of the heat produced in the catalase reaction. *Jour. Biol. Chem.* 50: Proc. XLII-XLIII. 1922.—The catalase reaction is exothermic and is accompanied by a definite heat production.—*G. B. Rigg.*

1461. NEMEC, ANTOINE, ET FRANÇOIS DUCHON. Sur la vitalité des graines et leur activité diastasique. [The vitality of seeds and their diastatic activity.] *Ann. Sci. Agron. Française et Étrangère* 38: 320-329. 1921.—Previously, it has been shown by the authors that diastatic activity diminishes with natural aging. In the researches here reported studies have been made of the activity of glycerophosphatase, lipodiasatase, urease, amylase, catalase, and phytoprotease of various seeds compared with their more or less conserved vitality. The data submitted show that with some enzymes at least, the diastatic activity diminishes with increasing age of the seed. However, there are seeds which have lost their germinating capacity that still show a greatly lessened activity of certain enzymes; the activity of catalase seems to disappear almost entirely. From this the conclusion is drawn that it is the activity of catalase that represents the vitality of the seed. This relationship offers some practical possibilities for rapid detection of vitality of seeds, to be reported later by the authors.—*A. B. Beaumont.*

1462. NEUBERG, C. Die physikalisch-chemische Betrachtung der Gärungsvorgänge. [Physico-chemical consideration of fermentation.] *Biochem. Zeitschr.* 105: 306. 1920.—This is a reply to W. Ostwald [see *Bot. Absts.* 12, Entry 1468].—*H. D. Hooker, Jr.*

1463. NEUBERG, C., und MARTA EHRLICH. Über die Beziehung der phytochemisch reduzierbaren Substanzen zum Vorgange der alkoholischen Gärung und über die Natur der Aktivatorwirkung. [The effect of phytochemical reducing substances on alcoholic fermentation and the nature of the activation.] *Biochem. Zeitschr.* 101: 276-318. 1920.—Alcoholic fermentation of glucose is accelerated by naturally occurring ketones, diketones, and disulphides, as well as by aldehydes, but to a smaller degree. Phytochemical reduction seems to be correlated with the ability to stimulate alcoholic fermentation. The stimulating effect is accompanied by a reduction of the reducing group in the activator. The presence of acetaldehyde during ordinary yeast fermentation is thought to have biochemical significance.—*H. D. Hooker, Jr.*

1464. NEUBERG, C., und MARTA EHRLICH. Weiteres über die Beziehung der Aldehyde zur alkoholischen Gärung. [The effect of aldehyde on alcoholic fermentation.] *Biochem. Zeitschr.* 101: 239-275. 1920.—Experiments with 71 aldehydes show that alcoholic fermentation of glucose and mannose is furthered by the aldehyde group, the nature of the radical attached thereto having no appreciable influence. This acceleration occurs equally in fermentation by living yeast cells and in fermentation by enzyme preparations. It is shown by all manner of aldose sugars, whether they be fermentable or not.—*H. D. Hooker, Jr.*

1465. NEUBERG, C., und H. OHLE. Zur Kenntnis der Carboligase. III Mitteilung, Der Bau der biosynthetisch verknüpften mehrgliedrigen Kohlenstoffketten. [Carboligase. III contribution. The structure of the biosynthetic connected, multibranched hydrocarbon



chains.] *Biochem. Zeitschr.* 127: 327-339. 1922.—A report is made of further work with carboligase, an enzyme of yeast, in converting sugar or pyroracemic acid to phenylpyroracemic alcohol in the presence of benzaldehyde. Further treatment with organic reagents and with dilute  $H_2SO_4$  results in a "biosynthesis" to 1-phenyl-acetyl-carbinol.—*W. W. Bonns.*

1466. NEUBERG, C., und E. REINFURTH. Ein neues Abfangverfahren und seine Anwendung auf die alkoholische Gärung. [A new procedure and its application to alcoholic fermentation.] *Biochem. Zeitschr.* 106: 281-291. 1920.—The intermediary production of acetaldehyde in alcoholic fermentation was demonstrated by the addition of dimethylcyclohexan-dione, 2 molecules of which condense with 1 of aldehyde with the elimination of 1 molecule of water. Sugars and ketones do not give the reaction. The same compound was obtained after fermentation with macerated yeast sap as with living yeast cells. Certain advantages of this procedure over the sulphite addition reaction are considered.—*H. D. Hooker, Jr.*

1467. NEUBERG, C., J. HIRSH, und E. REINFURTH. Die drei Vergärungsformen des Zuckers, ihre Zusammenhänge und Bilanz. [The three types of sugar fermentation.] *Biochem. Zeitschr.* 105: 307-336. 1920.—The 1st type of hexose fermentation yields alcohol and carbon dioxide; the 2nd acetaldehyde, carbon dioxide, and glycerol; the 3rd, acetic acid, alcohol, carbon dioxide, and glycerol. The 2nd type is considered primary, the carbon dioxide and acetaldehyde being derived from pyruvic acid. It is characterized by the amount of aldehyde fixed by sulphites as the bisulphite derivative. The 1st type is characterized by the amount of alcohol formed by reduction of acetaldehyde. In the 3rd type acetic acid and alcohol are formed from aldehyde by Cannizzaro's reaction, and the amount of acid or glycerol formed is characteristic. A quantitative cleavage of sugar to alcohol and carbon dioxide never occurs. When the 1st and 2nd types occur together the alcohol formed can be calculated as  $46/90 (Z-180/92G)$  or  $46/90 (180-44K-Z)$  where  $Z$  is transformed sugar;  $G$ , glycerol; and  $K$ , the total carbon dioxide produced. When the 1st and 3rd types occur together the amount of sugar fermented is:  $(180A + 135G)/92$ ; or  $180/92A + 135/30E$ ; or  $90(K/44 + G/92)$  or  $90(K/44 + E/130)$ , where  $A$  is the total alcohol produced and  $E$ , acetic acid.—*H. D. Hooker, Jr.*

1468. OSTWALD, W. Zur physikalisch-chemischen Betrachtung der Gärungsvorgänge. [Physico-chemical consideration of fermentation.] *Biochem. Zeitschr.* 105: 305. 1920.—This is a reply to C. Neuberger [see Bot. Absts. 12, Entry 801].—*H. D. Hooker, Jr.*

#### METABOLISM (RESPIRATION, AERATION)

1469. FITCH, C. P. The cultivation of *Bact. abortus* Bang. *Proc. Soc. Exp. Biol. and Med.* 19: 414-415. 1922.—*Bact. abortus* was cultivated in the presence of 10 per cent hydrogen to show that diminished oxygen tension rather than any specific effect of  $CO_2$  was responsible for the luxuriant growth of the organism.—*M. M. Brooks.*

1470. IRWIN, MARIAN, and MARGARET WEINSTEIN. Comparative studies on respiration XXI. Acid formation and decreased production of  $CO_2$  due to ethyl alcohol. *Amer. Jour. Bot.* 9: 277-282. 2 fig. 1922.—By use of a previously described apparatus [see Bot. Absts. 10, Entry 291], the authors found that in radish seedlings ethyl alcohol decreases the production of  $CO_2$ . At the same time, organic acids are produced, perhaps through the effect of the alcohol in accelerating the decomposition of certain substances and thus forming an excess of intermediate products in the form of acids. The fact that *Salvia* when treated with ether reacts in exactly the opposite manner, emphasizes the extreme complexity of the problems of respiration.—*E. W. Sinnott.*

1471. LANGWORTHY, C. F., and H. G. BAROTT. Heat elimination and gaseous exchange in grapefruit during storage. *Jour. Biol. Chem.* 50: Proc. XXXI. 1922.

1472. SMITH, EDITH PHILIP. Comparative studies on respiration XXII. The effect of lactic acid on the respiration of wheat. *Amer. Jour. Bot.* 9: 307-310. 2 fig. 1922.—In very

dilute solutions lactic acid first accelerates and then depresses the rate of production of  $\text{CO}_2$  by wheat seedlings in water culture. As the concentration of the acid increases, this preliminary rise becomes less marked till a concentration is reached where the rate begins to fall at once. On removal to distilled water recovery is in time complete. Sulphuric acid and dextrose have practically no effect on rate of respiration and the observed results are therefore probably not due to osmotic pressure or H-ion concentration but to some specific action of lactic acid. It is concluded that since this acid does not cause a permanent increase in the rate of production of  $\text{CO}_2$ , it is not an important intermediate substance in the metabolism of wheat.—*E. W. Sinnott.*

#### ORGANISM AS A WHOLE

1473. ABESAMIS, AMBROSIO P. Effect of time of planting on growth and yield of a lowland rice in Penaranda, Nueva Ecija, and on the college farm. *Philippine Agric.* 10: 381-392. 1922.—Time of transplanting and the amount of rainfall appeared to be very important factors in determining rice yield, high yields being correlated with large amounts of rainfall. Best cultures, which received about 1000 mm. of rainfall, gave a yield about 6 times as great as those which received less rainfall. Later maturity was also found to be correlated with greater amount of rainfall.—*Sam F. Trelease.*

1474. ARLOING, FERNAND, et LUCIEN THÉVENOT. Essais sur l'anaphylaxie chez les bactéries. Modifications produites par passages brusques dans les milieux de cultures bouillon-sérum à des taux différents. [Contributions to the study of anaphylaxis in bacteria. Modifications produced by abrupt changes in concentration of the bouillon-serum culture medium.] *Compt. Rend. Soc. Biol.* 87: 12-14. 1922.—Bacteria are very susceptible to sudden changes in composition of the medium and in consequence undergo modifications in their general biological characters. These changes are interpreted as being anaphylactic in nature, and involve the power of growth, virulence, and pigment formation of the bacteria.—*S. Morgulis.*

1475. CASELLA, DOMENICO. Studio sul polline delle piante da frutta. [The pollen of fruit trees.] *Staz. Sper. Agrarie Ital.* 54: 474-496. 1921.—The subjects studied are pollination; fruit formation; structure, form, color, and size of pollen grains of almond, peach, apricot, persimmon, pear, apple, grape, and mulberry; likewise the cultivation of the pollen in nutritive solutions, optimum sugar content of the germinating solution, types of germination, temperature relations, percentages of germination, and viability. The influence of germicidal substances on pollen germination and on fruiting are studied, as are also various teratological pollen forms. The conclusions are here summarized as follows: Pollination in the grape and mulberry is brought about by wind, whereas in the other plants studied (Rosaceae) it is brought about by insects. Rain, strong wind, and low temperature have a strongly deleterious influence on the process of pollination, whereas absence of rain and of fog, abundance of sunlight, moderate temperature, and a mild wind are advantageous. The form and size of pollen grains differ in the various species, varieties and even in individuals. The color varies in different genera. Saccharose in a concentration of 10-20 per cent is the best sugar for the germination of pollen. The pollen of grape is characterized by the formation of a small persistent bubble at the base of the pollen tube. Low temperatures interfere with germination and elongation of the pollen tube, whereas high temperatures accelerate the process. The optimum temperature is constant for each species and variety, as is also the percentage of germination. Pollen from diseased plants or branches has a lower percentage germination, while this power is slowly lost at a different rate in various varieties. With loss in germination capacity, not only a smaller percentage germinates, but the length of the germ tube is not as great as in normal pollen. Most germicidal substances (including sulphur) are deleterious to germination, even when applied directly to the plants during the flowering period. The same may be said for fruit inception. Abnormal types of germination are often observed.—*A. Bonazzi.*

1476. GERICKE, W. F. Certain relations between root development and tillering in wheat: Significance in the production of high-protein wheat. *Amer. Jour. Bot.* 9: 366-369. 1922.—More abundant tillering and culm production in wheat was obtained by the author in cultures

which received nitrogen comparatively late in the growing period than in those which received it at seeding, and he suggests that this may be due to differences in extent of root development at the time nitrogen was applied. He planted wheat seedlings, a few days old, in tap water where in 25 days they developed a large root system (presumably because of deficiency of nitrogen) but little new top growth. These seedlings were then placed in nutrient solutions, as was another set only a few days old, in which the tops were almost as large as in the first set but the roots only about  $\frac{1}{4}$  as large. The set with the large root system developed more than 4 times as many tillers per plant as the one with the small system, presumably because of the larger absorbing area. Plants grown in nitrogen-poor soil similarly develop a large root system and when nitrogen is then added, absorb much more of this nutrient that is needed for normal growth, and abundant tillering results.—*E. W. Sinnott.*

1477. KNUDSON, LEWIS. Nonsymbiotic germination of orchid seeds. *Bot. Gaz.* 73: 1-25. 1922.—An account of earlier attempts to germinate orchid seed is given. The author employed agar slants on which were sown seed of *Cattleya* and *Laelia*. The nutritive medium was Pfeffer's solution and a modification thereof plus sugars. Fructose proved more favorable for growth of embryos than glucose. A plant extract (yeast, wheat) used with glucose, however, induced satisfactory germination. No gain in germination was obtained beyond 0.08 per cent concentration of the glucose. Introduction of *Bacillus radiculicola* proved definitely favorable. *Azotobacter* sp. retarded growth. Transplantation from tubes to Erlenmeyer flasks, thence to proper soil, was practiced. This method is believed to be commercially valuable. Regarding fungus relations the author suggests that "germination is induced not by any action of the fungus within the embryo but by products produced externally on digestion or secreted by the fungus." A final statement is made, however, that at this time the "validity of the fungus hypothesis cannot be proved or disproved."—*B. W. Wells.*

1478. SHULL, C. A. Soil conditions and plant growth. [Rev. of: RUSSELL, E. J. Soil conditions and plant growth. *Rev. ed.*, xii + 406 p., 32 fig. Longmans, Green & Co.: New York, 1921.] *Bot. Gaz.* 73: 153. 1922.

1479. WANSEER, H. M. Photoperiodism of wheat; a determining factor in acclimatization. *Science* 56: 313-315. 1922.—From a study of the data for the behavior of winter and spring wheats as regards jointing and heading, it is concluded that there exists a critical stimulus for jointing and that it is a critical photoperiod with a maximum limit. Winter wheat also requires a separate and distinct photoperiod for heading but spring wheat can joint and head in the same season.—*C. J. Lyon.*

### GROWTH, DEVELOPMENT, REPRODUCTION

1480. CLARK, N. A. The rate of formation and the yield of yeast in wort. *Jour. Phys. Chem.* 26: 42-60. 1922.—The rate of reproduction of "normal," actively budding yeast (*Saccharomyces cerevisiae*, race F) follows the "logarithmic formula,"  $\log C/C_0 = 0.160 t$ , from the moment of seeding until the concentration is 100 million cells per cc. (regardless of whether seeding was 5 cells or 8 million cells or more per cc.) if the culture is properly shaken and aerated. In this equation  $C_0$  signifies the initial number of yeast cells per cc. and  $C$  the number at any time,  $t$ . The solution with 100 million cells per cc. contains 1.8 gm. of alcohol per 100 cc. Above this alcohol content the number 0.160 in the equation must be replaced by a quantity that is a function of the percentage of alcohol if the percentage be below 5. The maximum number of cells is about 325 million per cc. although if the wort were heavily inoculated (up to 400 per cc.) the crop might reach 675 million because of the lower alcohol content. If the culture is diluted but contains 10 per cent or more of wort, the rate and the maximum are the same as if pure wort had been used. If less wort is used the rate is the same but the maximum is low because there is too little bios (perhaps the "water-soluble vitamine"). Quantitative measurements of the crop may be used to determine quantitatively the amount of bios; the maximum is reached in about 24 hours. Washed yeast cake rapidly absorbs bios from wort and if enough yeast is used the removal is practically complete and the cells do not bud.—*H. E. Pulling.*



1481. KÖHLER, E. *Über rhythmische Erscheinungen bei Wachstum und Gärung der Hefe.* [Periodicity in yeast growth and fermentation.] *Biochem. Zeitschr.* 106: 194-206. 1920.—Yeast fermentation and growth during alcoholic fermentation showed periodicity caused by changes in the sugar and alcohol content of the nutrient medium. The rate of growth is determined by the sugar concentration but the growth curve was irregular at high concentrations.—*H. D. Hooker, Jr.*

1482. REED, H. S. A method for obtaining constants for formulas of organic growth. *Proc. Nation. Acad. Sci. [U. S. A.]* 7: 311-316. 3 fig. 1921.—The equation of autocatalysis,  $\log \frac{x}{A-x} = K(t-t_1)$  sometimes gives values for  $x$  which are somewhat too large in the early life of an organism. The author describes a simple graphic method which may be used to overcome the difficulty. Assuming that the true state of affairs is represented by the equation:  $\log \frac{x}{A-x} = K(t-t_1)^c$ , we may write:  $\log (\log \frac{x}{A-x}) = \log K + c \log (t-t_1)$ . This is the equation of a straight line if  $\log (\log \frac{x}{A-x})$  be used as ordinate and  $\log (t-t_1)$  as abscissa.

The intercept of this line on the  $y$ -axis will be  $\log K$  and the slope of the line,  $c$ . Examples of the use of the method are given showing the computed values of  $x$  obtained for the growth of shoots on several trees.—*H. S. Reed.*

1483. SCHAFFNER, J. H. Progression of sexual evolution in the plant kingdom. *Ohio Jour. Sci.* 22: 101-113. 1922.—The main factor in the evolution of sexual dimorphism is said to be the shifting of the time when sexual states arise from the neutral state, ranging from a late stage of gametogenesis in the lowest forms backward through ontogenetic history until the sexual state of both sporophyte and gametophyte is established when the egg is fertilized or even before. On this basis plants are classified in 4 main groups: (1) those having no sexual stage; (2) a series with reduction of chromosomes in the zygote or at the end of the sexual generation just before gametogenesis; (3) a homosporous series with antithetic alternation of generations; and (4) a similar heterosporous series with the gametophytes unisexual and the sporophytes bisporangiate or monosporangiate. Since the sexual state is usually determined in somatic cells when neither segregation nor association of chromosomes is taking place, it is concluded that sex cannot be associated primarily with special chromosomes and that fundamental sexual phenomena are caused by properties entirely apart from Mendelian units.—*H. D. Hooker, Jr.*

1484. SPEK, J. Beiträge zur Kolloidchemie der Zellteilung. [The colloid chemistry of cell division.] *Kolloidchem. Beih.* 12: 1-91. 1920.—Many observations during the author's 3-year study support O. Bütschli's hypothesis that changes in surface tension induce cell division, but questions concerning the physical chemistry of the process were untouched by Bütschli. Of these the chief are: Is a definite water content necessary for cell divisions? Does increase in water content lead to division? Recent researches of others establish an increased permeability of the cells just before division and this the author thinks must be due to either increased swelling of membrane and plasma colloids or to a decrease in the precipitating power of the outer medium. Since the latter does not take place the former must occur, either by increased hydration or plasma alteration in the direction: gel to sol; or both. If by any means the permeability is increased, water will be absorbed unless the plasma is saturated, so that increase in water content might not induce cell division but only accompany it. If increase in water content is causative, treating the cell with reagents that increase imbibition (previous researches indicated that the ions affect it in the following order:  $\text{SCN} > \text{I} > \text{BR} > \text{NO}_3 > \text{ClO}_3 > \text{Cl} > \text{acetate} > \text{SO}_4$ ;  $\text{Li} > \text{K} > \text{Na} > \text{alkaline earths}$ ; fatty acids and narcotics also increase imbibition) should induce cell division. This is known to be true, especially from work on artificial parthenogenesis. The author also tested this, using *Paramoecium* in salt-solution-hay-infusion cultures. In all experiments decidedly more abundant cell division occurred in the medium than in the controls, frequently 10 times as much. Salts that do not penetrate the

protoplasm withdraw water by osmosis and decrease the rate of growth and the rate of division, whereas the effective salts increase the volume of the cell. Concerning the action of the salts the author suggests that before division the cell becomes more liquid at the expense of those protoplasmic structures that maintain the form of the cell. This increase in fluidity permits hydrodynamic effects and the cell becomes more nearly spherical and stains less vividly. This is also characteristic of those pathological (embryonal) conditions that are characterized by rapid cell division. There are now 2 possibilities: (1) gas exchange is easier when the plasma is more fluid and respiration is more rapid. This should be experimentally investigated. (2) There is an acceleration of those processes in which water directly plays a part. At the beginning of cell division there is formation of nucleoproteins and this is supposed to be at the expense of bodies that contain lecithin and phosphoric acid. But since lecithin is thereby hydrolyzed, the importance of water in the first steps of the chemical degradation of cell materials is indicated. At the outset the process proceeds with the normal amount of water and oxygen, but during nuclein formation probably a base (cholin) is liberated which increases imbibition by the colloids, increases the amount of water that is held, facilitates gas exchange, and so increases the formation of nucleoproteins. The author discusses the mechanism of parthenogenesis and reviews the literature of cell division, the experimental evidence of which, he believes, supports his conceptions.—*H. E. Pulling.*

### MOVEMENTS OF GROWTH AND TURGOR CHANGES

1485. BREMEKAMP, C. E. B. Über den Einfluss des Lichtes auf die geotropische Reaktion. [The influence of light on the geotropic reaction.] *Recueil Trav. Bot. Néerland.* 18: 373-438. 3 pl., 9 fig. 1921.—In these experiments there were used coleoptiles of a pure-line *Avena*. As an average geotropic reaction was desired the plants were kept in a horizontal position for 5, 15, 20, 30, or 45 minutes (usually 20 minutes), but when the centrifugal apparatus was used the time of induction was considerably shortened. The strongest light source was a Philips  $\frac{1}{2}$  Watt lamp op + 300 H. K., the heat rays of which were absorbed by a cooling apparatus. The light was examined at intervals by a Weber photometer.—When illuminated seedlings are in a horizontal position, the normal geotropic curvature is followed by an antitrope curvature. If, before illumination, seedlings are placed directly in a horizontal position, the antitropous curvature is at first noticed at the apex, extending later toward the base. Plants remaining erect for a time after illumination do not show antitropous curvature at the top; but in regions progressively further from the apex, more time elapses between illumination and orientation in a horizontal position.—The amount of photogenic antigeotropic curvature depends upon time and intensity of illumination.—A one-sided illumination when strong enough is as important as a several-sided illumination in causing an antigeotropic curvature in plants which remain for some time in the horizontal position, though too much time should not elapse between the illumination interval and the horizontal arrangement.—*J. C. Th. Uphof.*

1486. MERL, EDMUND M. Biologische Studien über die Utriculariablase. [Biological studies of the Utricularia bladder.] *Flora* 115: 59-74. 3 fig. 1922.—Repetitions and original experiments led to the following conclusions: the engulfing of small animals is not due to their activity but to the action of the bladder; contracted bladders are in an irritable condition and a touch upon the bristles or the lip near the bristles causes the lip to contract, forming an opening, and the walls of the bladder to expand so that the suction created draws in whatever may be in the vicinity of the opening; after a resting period the bladder is again irritable; when bladders are removed from water partial drying causes a difference in tension which brings about the reaction; puncture causes permanent expansion. The reaction is bound up with the turgescence of the plant but is difficult to explain. No effect is produced by ammonia, glycerine, alcohol, mercuric chloride, ether, chloroform, an electric current, or lowered atmospheric pressure. Irritability could not be eliminated by cold, heat, or narcotics until there was serious injury to the bladder. A stimulus does not appear to change the size of the intercellular air spaces, as in *Mimosa*, although this is difficult to determine under the high power necessary for observation. The position, shape, and action of the bristles suggest the stimula-

tion theory. Another explanation suggested is that the elastic lip and side walls are in equilibrium; the slightest motion disturbs this and the lip and walls spring back; the inner hairs absorb water and restore equilibrium. The 2 difficulties confronting this theory are: (1) the bladders act the same whether filled with air or water; (2) the extreme slowness of water movement in water plants. Methylene blue quickly stains the inner hairs, but there is no movement in the vessels.—*L. M. Snow.*

1487. SIERP, HERMANN. Über den Einfluss geringer Lichtmengen auf die Zuwachsbewegungen der Koleoptile von *Avena sativa*. [The influence of small quantities of light on the growth movement of the coleoptile of *Avena sativa*.] Ber. Deutsch. Bot. Ges. 37: 123-128. 1919.—The author's measurements of the change in growth rate of oat coleoptiles after exposure to relatively weak light stimulation were prompted by Vogt's statement (Zeitschr. Bot. 7: 1915) that illumination of 2880 meter-candle-seconds (M.C.S.) (16 meter-candles [M.C.] for 3 minutes) or less produced no distinct change in the growth rate of the coleoptiles, and by Blaauw's reference of [Zeitschr. Bot. 6: and 7:] the phototropic curvatures (which he secured with illumination intensities as low as 10-20 M.C.S.) to the influence of light upon the growth rate of the illuminated side of the coleoptile. Sierp found changes in the growth rate following such weak stimulation as 10 M.C.S. (10 M.C. for 1 second). His tables and curves show the changes in growth rate for a period of 4 hours after exposure to illumination of 10, 100, and 2000 M. C. S.—*R. M. Holman.*

1488. WEEVERS, TH. Concerning the influence of light and gravitation on *Pellia epiphylla* (Corda). Proc. Roy. Acad. Sci. Amsterdam [translated from Verslag K. Akad. Wetenschappen Amsterdam] 24: 2-11. 1921.—Experiments are presented on the phototropic, photogrowth, and geotropic reactions of the growing sporogonium stalks of *Pellia*. The entire stalk is perceptive of the stimulus and any stimulated part may respond. In phototropic experiments, stalks 15-25 mm. in length were used. Exposed unilaterally to sunlight, distinct curvature appears in 5 minutes. The minimum stimulus effecting a response was light energy equivalent to 400 meter-candle-seconds (M. C. S.); reaction time was 150 minutes. The shortest reaction time was effected by 15,000,000 M. C. S. This is contrasted with the shortest reaction time for *Acno*, which is about 100 M. C. S. No pronounced negative reaction was observed.—The blue rays are shown to be the effective rays.—Using light of 75 M. C. with an energy value of 22,500-45,000 M. C. S., a distinct photogrowth reaction was produced on the sporogonium stalks of plants that had been kept in the dark. The mean retardation in growth of 6 observations was 35 per cent.—Stems are negatively geotropic. The minimum exposure period resulting in a reaction was 10 minutes and the reaction time was 150 minutes. The author suggests that turgor changes have nothing to do with curvature of the stalk and that an explanation must take into consideration the colloidal chemistry of protoplasm and cell wall.—*L. Knudson.*

#### GERMINATION, RENEWAL OF ACTIVITY

1489. BAINES, A. E. Germination in its electrical aspect. 185 p., 130 fig. George Rutledge & Sons: London; E. P. Dutton & Co.: New York, 1921.—The author contends that plants possess electrical systems and that such organs as fruits, seeds, and stems are electrical cells incapable of being polarized. For example, the edible portion of the apple, charged positively by the air which enters at the open calyx end, continuously induces a negative charge in the core, from which it is separated by a non-conductive tissue. Such processes as cell division, growth, seed germination, and life itself, inexplicable on the basis of chemical reactions alone, are dependent on stimuli which are electrical in nature. "The fundamental principle governing the nature of a seed is this: the seed substance must receive a continuous charge of electricity; this charge must be induced or the seed would rot, and no such charge can be imparted until the seed becomes in effect a Leyden jar." Plants grown in electrified soil exceed controls and in electrified soil less moisture is required to produce a given amount of growth. An attempt is made to explain hearing, sleep, and allied phenomena, even cancer, on the basis of electrical stimuli, though few practical data are presented. [See also Bot. Absts. 10, Entry 1976; 11, Entry 816].—*S. G. Lehman.*



1490. FRYER, J. R. Influence of light and fluctuating temperature on the germination of *Poa compressa*. Sci. Agric. 2: 225-230. 1922.—Sunlight was believed to be somewhat beneficial in germinating *Poa compressa*. Daily fluctuations in temperature between 16 and 35°C. were most suitable and better than a steady temperature.—B. T. Dickson.

1491. MCHARGUE, J. S. Some points of interest concerning the cocklebur and its seeds. Ecology 2: 110-119. 1 fig. 1921.—The writer lists the native species of *Xanthium* as *X. canadense*, *X. commune*, *X. speciosum*, and *X. echinatum*; while those native of the old world are, *X. spinosum* and *X. strumarium*. Possibilities of the use of the seed for oil and a consideration of the plant as a pest to the agriculturist and wool-growers are given. The morphology of the paired seed in the bur is described and the delayed germination of the smaller one discussed. The older work of Arthur, Masterman, and Crocker which furnished the theory that the delay in germination of the smaller seed until the 2nd spring is due to differences in the enzyme content of the embryo or to differences in the character of the seed-coats is reviewed. With selected-seed of *X. commune* the writer found equal amounts of oxidases and peroxidases, indicating equal viabilities in large and small seed. Germination tests of seed removed from the burs showed that 100 per cent of the larger seed and 86 per cent of the smaller germinated in a given time with a tardiness of 24 hours as a mean for the smaller. There is no marked dormancy of such seed and no inherent property for delayed germination in embryos or seed-coats. Another series of tests showed that the conditions in the bur were the cause of the delay in *X. commune*. The septum of the bur which protects the smaller seed is thicker and shorter than that of the larger seed and this prevents the absorption of oxygen or moisture as readily as in the larger. By the 2nd spring this septum has disintegrated enough to allow germination of the smaller seed. Occasionally simultaneous germinations do occur. Differences in vigor of the 2 seedlings are due to the larger amount of food in the large seed; other tests showed the presence of a glucoside in larger amounts in the large seed. Sugars are formed from fats or cellulose as these seed contain no starch. The presence of oxidases, peroxidases, catalase, proteolytic and lipoclastic enzymes was demonstrated. Histological examinations showed that the cells of large and small seed are identical.—H. H. M. Bowman.

1492. WEBB, ROBERT W. Studies in the physiology of the fungi. XV. Germination of the spores of certain fungi in relation to hydrogen-ion concentration. Ann. Missouri Bot. Gard. 8: 283-341. Fig. 1-39. 1921.—In continuation of work previously reported [see Bot. Absts. 4, Entry 1575] Webb has broadened his experiments on the effects of active H- and OH-ions upon germination by the use of solutions other than mannite, such as Czapek's solution, peptone, beet decoction, water, and mannite + beet decoction. The spores of the following fungi were utilized: acid forms, *Botrytis cinerea*, *Aspergillus niger*, *Penicillium cyclopium*, *P. italicum*, *Puccinia graminis*, and *Lenzites saepiararia*; acid and alkaline form, *Fusarium* sp.; alkaline form, *Colletotrichum Gossypii*. Experiments show that under favorable nutritive conditions the active H-ions are favorable to germination while the OH-ions are relatively detrimental. The optimum active acidity for a majority of the fungi seems to range between pH 4.0 and 3.0. The limits on the acid side are comparatively narrow, inhibition being reached near pH 2.5-1.5. The limits on the alkaline side are very diverse, varying with the organism and medium. The various nutritive solutions used gave different ranges, and percentages, of germination. From visual observations the mycelial growth is inhibited by virtually the same H- and OH- ion concentrations as those which have inhibitive action on germination. In equal concentrations of the 2, the OH- ions are relatively more toxic to spores than the H-ions. The composition of the medium seems to influence the activity of the OH-ions in this respect more than the H-ions may be antagonized. The range of shifting of reaction depends on the organism and composition and original reaction of the medium. Under conditions of active alkalinity the range of germination in beet decoction is noticeably expanded. Germination here may be stimulated by some special substance or condition (possibly buffer effect?), which may be wanting in synthetic media.—Increasing the incubation period does not change the relation of germination to H-ion concentration. "The curves of germination for any organism are practically identical, whether incubated at a temperature representing a pro-

visional optimum, or at 4-5°C. above or below such an optimum. Germination often occurs feebly in cultures possessing a H-ion concentration closely approaching that of inhibition" and differences manifest within favorable ranges tend "to occur over the widest range at the optimum temperature." The data developed in this paper are of fundamental importance in the future study of acid or alkaline fungicides or spray mixtures which may be applied to control the germination of fungous spores.—S. M. Zeller.

1493. YOUNGMAN, W. The influence of atmospheric conditions upon the germination of Indian barley. Mem. Dept. Agric. India Bot. Ser. 11: 145-151. 1921.—Experiments on the influence of humidity on the germination of Indian barley are described. A vapor pressure of 0.87 inches (0.0213 gm. water vapor per l. of air) may be taken as the safest maximum to which Indian barley, intended for export for malting purposes, may be exposed. Exposure for 14 weeks to this degree of humidity has no deleterious effect. Exposure to greater amounts of humidity than this is serious. A vapor pressure of 0.89 inches (0.0216 gm. water vapor per l.) after 14 weeks or less reduces the germination by some 25 per cent, and higher humidity totally destroys germinating power in 14 weeks or less.—A. Howard.

### TEMPERATURE RELATIONS

1494. EVANS, CLYTEE R. Effect of temperature on germination of *Amaranthus retroflexus*. Bot. Gaz. 73: 213-225. Fig. 1-4. 1922.—A summary of the literature dealing with the temperature factor is given. The author finds that the behavior of *Amaranthus* seed parallels the data of Leitch (pea seedlings), Lebenbaur (corn seedlings), and Ball (sore shin fungus) with regard to coefficients relating rate of germination to temperature. For methods of seed treatment (abrasion, acid) the general trend of the coefficients was the same. The restricting effect of the coats is shown particularly in the case of after-ripened seed at low (8-11.6°C.) and at high (42-46.1°C.) temperatures. These effects can be lessened by treating the coats with sulphuric acid or abrading them with sand.—B. W. Wells.

1495. SIGALAS, R., et H. MARNEFFE. A propos de la résistance de quelques graines à de hautes températures. [The resistance of certain grains to high temperatures.] Compt. Rend. Soc. Biol. 87: 193-195. 1922.—Experiments confirm Gain's discovery that the seed of *Helianthus annuus* L. may be exposed to heat up to about 150°C. without losing the power to germinate.—S. Morgulis.

1496. STEVENS, NEIL E. Environmental temperatures of fungi in nature. Amer. Jour. Bot. 9: 385-390. 1 fig. 1922.—Plant parts when exposed to the sun often show a temperature which is markedly above that of the air and which may fluctuate more rapidly and extremely than does the air temperature in the shade. The temperature environment of the fungi which grow on these plant parts must therefore differ widely from that which is usually supplied them when growing in pure culture in heated laboratories.—E. W. Sinnott.

### RADIANT ENERGY RELATIONS

1497. HARVEY, R. B. Growth of plants in artificial light from seed to seed. Science 56: 366-367. 1922.—By the use of continuous artificial light, crops of wheat, oats, barley, rye, potatoes, buckwheat, lettuce, beans, peas, radishes, etc., were grown and produced viable seed in seasons much shorter than by daylight. No such fixed period of illumination, as found essential by Garner and Allard, seemed necessary except for cabbage. Plant breeders can use this method to produce more generations.—C. J. Lyon.

### TOXIC AGENTS

1498. CLOWES, G. H. A., and H. W. SMITH. Carbon dioxide as an inhibitor of cell growth. Jour. Biol. Chem. 50: Proc. IV. 1922.—Carbon dioxide has an inhibitory effect in cell growth, bearing no relation to H-ion concentration.—G. B. Rigg.

1499. COOK, F. C. **Changes in the composition of the Irish potato tuber during growth with particular reference to the influence of copper sprays.** Jour. Biol. Chem. 50: Proc. XIII. 1922. —Copper sprays have a beneficial effect on the growth and development of potato tubers. This was true in northern Maine in 1921 when no *Phytophthora infestans* was present.—G. B. Rigg.

1500. DOERR, R. **Zur Oligodynamie des Silbers.** [Oligodynamics of silver.] Biochem. Zeitschr. 106: 110–133. 1920.—Water long in contact with metallic silver becomes bactericidal (oligodynamic). The disinfectant property was quantitatively decreased by dilution with distilled water and quantitatively increased upon concentration by distillation. Sodium chloride was antagonistic, weakening and delaying the bactericidal effect. Horse serum destroyed it. Some bacteria were more susceptible than others to metallic silver. Solutions of silver salts had all the properties of the bactericidal water, which was thought to owe its oligodynamic property to silver oxide in solution.—H. D. Hooker, Jr.

1501. FULMER, ELLIS I. **The acclimatization of yeast to ammonium fluoride and its reversion in wort.** Jour. Phys. Chem. 25: 455–472. 1921.

1502. GUÉRIN, P. **L'action du chlore et de certaines vapeurs sur les plantes supérieures.** [The action of chlorine and certain vapors upon the higher plants.] Ann. Sci. Agron. Française et Étrangère 38: 10–19. 1921.—The literature is briefly reviewed and the results of a series of experiments on many genera and species of higher plants with chlorine, methyl mono-chlor chloroformate, bromacetone, ethyl di-chlor sulphide (mustard gas), chloroform, ether, ethyl chloride, several alcohols, phenols, and aldehydes are reported. Chlorine gas was most severe in its action, causing the plants to lose their leaves. In other cases the effects varied from a slight bleaching to a blackening of the leaves. The effect of the treatments is a plasmolysis, which was proved by microscopic examination of affected tissue and by the reddening of sodium picrate papers suspended in vessels above treated plants. It is claimed that in the plasmolytic action hydrocyanic acid liberated by the action of emulsin on a glucoside acts on the paper. Certain odors emanated by some plants during treatment are noted as further evidence of plasmolysis.—A. B. Beaumont.

1503. MÜLLER, ALFR. **Die Resistenz der Milzbrandsporen gegen Chlor, Pickelflüssigkeit, Formaldehyd und Sublimat.** [The resistance of anthrax spores to chlorine, pus, formaldehyde, and sublimate.] Dissertation. 12 p. München, 1920.

1504. NEMEC, A., und F. STRANAK. **Beitrag zur Kenntnis des toxischen Einflusses der Terpene auf die höheren Pflanzen.** [The toxicity of terpenes to the higher plants.] Biochem. Zeitschr. 104: 200–213. Pl. 1–7. 1920.—Characteristic alterations in histological structure arose from subjecting plants to terpene vapors. The xylem tracheae and epidermis became brown in sprouted beans, corn, yellow lupines, and peas, and black in etiolated specimens of these plants. The discoloration is attributed to oxidation of tannins to so-called humins by peroxidases, the terpenes playing the role of peroxides.—H. D. Hooker, Jr.

1505. WINDISCH, W., W. HENNEBERG, und W. DIETRICH. **Über die Einwirkung oberflächenaktiver Nonylsäure und einiger oberflächenaktiver höherer Homologe der Alkoholreihe (Amylalkohol und Octylalkohol) auf die Hefezelle und die Gärung.** [The influence of nonylic acid, amyl alcohol, and octyl alcohol on yeast and fermentation.] Biochem. Zeitschr. 107: 172–190. 1920.—Nonylic acid in concentrations ranging from 0.005 to 0.02 per cent and octyl alcohol in concentrations from 0.017 to 0.04 per cent retarded and finally stopped fermentation, inducing pathologic conditions and eventually death of the yeast cells. Alteration of cell shape and fat formation occurred at the same time. These phenomena are attributed to "surface activity" and not to chemical properties. This influence is thought to have practical significance as the same or similar "surface active" compounds arise during fermentation.—H. D. Hooker, Jr.



## ELECTRICITY AND MECHANICAL FORCES

1506. STERN, KURT. Über polare elektronastische Erscheinungen, 3 Mitteilung. [On polar electronastic phenomena. Third communication.] Ber. Deutsch. Bot. Ges. 40: 43-51. Fig. 1-2. 1922.—The question which the author seeks to answer is: How do the polar reactions of *Mimosa pulvini* behave with different stimulus intensities, (a) of direct current, (b) of condenser discharge, and (c) of induction shock? Attention is called to 3 important sources of error which are related (1) to the effect of different current intensities, (2) to the formation of parallel currents or branching currents, and (3) to the stimulus-conducting processes. Although the applied potential in volts is often used (by Bose, the present author, and many others) as an approximate measure of an electrical stimulation, the electrical potential as such does not act as a stimulus. This is shown by the fact that when a *Mimosa* plant standing upon a paraffin plate is brought into contact with the pole of an electrical conductor charged to 240 volts, no visible reaction ensues, although the plant is thus charged to this high potential. However, when the pot is grounded an intense reaction follows, the result not of the mere charge but of the passage of a current from the 240-volt pole to the earth. It is the strength of this current and not the potential applied which, other things being equal, determines the stimulus. Since the resistance offered by the plant to the passage of the current influences the strength of the current, the voltage applied can be used as a measure of the stimulus intensity only when the current passes through the same portions of the plant or through portions of the same or different plants offering equal resistance. Experimentally, the resistance is not proportional to the length of the region of the plant through which the current passes, due probably to differences in diameter of the water-conducting elements in different parts of the plant (e.g., stem and petiole). Leaflets of the same leaf differ greatly in resistance, and old leaves offer much greater resistance than corresponding portions of younger leaves, presumably on account of the presence of more air in the vessels of the older leaves. Strength of current and also the dimensions of the cross section of the organ stimulated must be taken into account in determining the intensity of the stimulus. Errors may arise as the result of the sudden movement of the whole shoot (a movement which often interrupts the current by destroying the contact of one of the electrodes) when the circuit is closed.—R. M. Holman.

## MISCELLANEOUS

1507. HARRISON, ARTHUR P. A simple gas generator for laboratory use. Science 56: 287-288. 1922.—This paper explains the construction and operation of a generator suitable for gases used in the laboratory in comparatively small quantities. It can be made of materials found in all laboratory equipment and but 1 generator is needed for the several gases.—A wide mouth bottle contains the acid, the stopper of which has a small stopcock opening and a larger hole for the insertion of a large test tube. Into this tube is set (through a rubber stopper) a smaller test tube containing the solid reagents. Contact between reagents is effected by small holes in the bottoms of the tubes, and the gas pressure controls the entrance of the acid.—C. J. Lyon.

1508. PFYL, B., G. REIF, und A. HANNER. Über den Ersatz des Morphins beim Nachweis von Methylalkohol in Trinkbranntweinen. [Substitutes for morphine in testing potable spirits for methyl alcohol.] Zeitschr. untersuch. Nahrungs- u. Genussmittel 42: 218-225. 1921.

1509. VISCIO, SABATO. Sul valore alimentare dei semi dell'Ervum Ervilia. Nota IV. [The food value of seed of *Ervum Ervilia*.] Atti R. Accad. Lincei Roma Rend. (Cl. Sci. Fis. Mat. e Nat.) 31: 391-394. 1922.—Rats fed with flour made from the seed of *Ervum Ervilia* to which a small proportion of purified casein from milk had been added showed none of the loss in weight or symptoms of disease resulting when fed on the seed of *E. Ervilia* alone.—F. M. Blodgett.

## SOIL SCIENCE

A. G. McCALL, *Editor*

(See in this issue Entries 939, 952, 954, 957, 959, 966, 967, 972, 973, 1075, 1077, 1078, 1397, 1424, 1427, 1478)

## TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*E. B. PAYSON, *Assistant Editor*

(See in this issue Entries 1004, 1006, 1093, 1094, 1113, 1372, 1388, 1513)

## MISCELLANEOUS

B. E. LIVINGSTON, *Editor*S. F. TRELEASE, *Assistant Editor*

1510. ANONYMOUS. Making petroleum from colza oil. *Sci. Amer.* 126: 93. 1922.

1511. ANONYMOUS. Neunzehnte Hauptversammlung des Vereins deutscher Nahrungsmittelchemiker zu Jena am 19. bis 22. September, 1921. [Nineteenth Convention of German Society of Food Chemists at Jena, September 19-22, 1921.] *Zeitschr. Untersuch. Nahrungs-u. Genussmittel* 43: 1-168. 1922.—Minutes and presentation of papers, some of which are elsewhere noted are given.—*E. E. Stanford.*

1512. ANONYMOUS. The consumption of wheat in New South Wales. *Agric. Gaz. New South Wales* 33: 624. 1922.—The per capita consumption of wheat in New South Wales has decreased from 5.7 to 5 bushels during the past 3 years. [Reviewed from Official Year Book of New South Wales.]—*L. R. Waldron.*

1513. BEHRE, A. Die Methoden der Kunsthoniguntersuchung, insbesondere der Bestimmung der Saccharose und des Stärkesirups. [Methods of investigation of artificial honey, with special reference to the estimation of saccharose and glucose.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 43: 24-44. 1922.

1514. BEYTHIEN, A. Über Kunsthonig. Bericht über die erneute Beratung der vom Verein Duetscher Nahrungsmittelchemiker ernannten Komission mit Vertretern der Industrie [Artificial honey. Report in the revised agreement between the committee appointed by the Society of German Food Chemists with representatives of the industry.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 43: 153-157. 1922.

1515. BLAKE, S. F. Native names and uses of some plants of eastern Guatemala and Honduras. *Contrib. U. S. Nation. Herb.* 24<sup>4</sup>: 87-100. *Pl.* 29-33. 1922.—This paper consists of an alphabetical list of the vernacular names of certain plants of eastern Guatemala and Honduras collected by the botanists of a State Department Mission of 1919. The vernacular names are cross-referred to the corresponding scientific names, arranged in the same alphabet, under which brief notes on the uses of the plants are given. Five of the species are illustrated — *Achras chicle*, *Cassia alata*, *Neurolaena lobata*, *Piper auritum amplifolium*, and *Smilax ornata*.—*S. F. Blake.*

1516. BRITTON, ELIZABETH G. Plant sanctuaries. *Amer. Fern Jour.* 11: 108-109. 1921 [1922].



1517. DENHAM, H. J. A multiple switch and commutator for thermocouples. *New Phytol.* 21: 166-168. 1 fig. 1922.—A rotary commutator designed to work in an oil bath at constant temperature is described.—*I. F. Lewis.*
1518. DENHAM, H. J. Laboratory notes. The projection microscope. *New Phytol.* 21: 163-165. 1 fig. 1922.—Suggested improvements and comments on the projection apparatus of Small [see *Bot. Absts.* 12, Entry 1529] are given.—*I. F. Lewis.*
1519. GINSBERG, I. Artificial cork. Waste materials used in its manufacture, and the applications found for it. *Sci. Amer.* 126: 91. 5 fig. 1922.
1520. GRIFFITH, IVOR. Hay fever diagnosis and treatment. *Amer. Jour. Pharm.* 94: 586-589. 1922.—The author quotes work by Scheppegegrell on the classification of hay-fever-producing plants, and adds a few notes as to diagnostic tests and prophylactic treatment by means of pollen extracts.—*Anton Hogstad, Jr.*
1521. HAAS, PAUL. The importance of carbohydrates in present-day economy. *Pharm. Jour.* 108: 222-224. 1922.—A summary of the indispensable and universal uses of carbohydrates as food and in the industries is combined with a summary of the more important efforts within recent years to increase the world production of carbohydrates. The Stone Age, the Bronze Age, and the Iron Age mark successive epochs of human civilization; the present epoch might not inaptly be described as the Carbohydrate Age.—*E. N. Gathercoal.*
1522. JUCKENACK, A. Über Ernährungsfragen vom Standpunkte der Wissenschaft, Wirtschaft und Gesetzgebung. [Nutritional questions from the standpoints of science, domestic economy and legislation.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 43: 9-21. 1922.
1523. LAWALL, CHARLES H. Foods of the next century. *Amer. Jour. Pharm.* 94: 309-329. 1922.—This popular lecture concerns the various types of food cranks,—the calory crank—the vitam in crank, and the imaginative individual who looks forward to the synthetic foods of the future, when by swallowing tablets the time devoted to dining will be saved. The foods of the past and the food problem of the future are discussed. A list of some 20 food yielding plants of foreign lands is given.—*Anton Hogstad, Jr.*
1524. LEVY, FRITZ. [Rev. of: SCHAFER, JOSEF. Vorlesungen über Histologie und Histogenese nebst Bemerkungen über Histotechnik und das Mikroskop. (Readings on histology and histogenesis, with remarks concerning histological technique and the microscope.) viii + 528 p., 12 pl., 589 fig. Wilhelm Engelmann: Leipzig, 1920.] *Arch. Zellf.* 16: 286-287. 1922.
1525. MASKEN, FREDERICK. Disinfecting railroad cars. *Monthly Bull. California Dept. Agric.* 10: 260-265. 1921.—After several experiments in cleaning and disinfecting cars, live steam came into use at a cost of only 85 cents per car. By use of this method, a minimum temperature of 180°F. can be attained in 10 minutes. An ordinary locomotive engine is used. To test the efficiency of this method, a case containing various live insects was placed in the car, and in a very short time after the steam was turned on all were killed.—*E. L. Overholser.*
1526. MOSLER. [Rev. of: PFEIFFER, CHR. Grundbegriffe der photographischen Optik. (Fundamental principles of photographic optics.) Th. Thomas: Leipzig, ?] *Arch. Zellf.* 16: 285-286. 1922.
1527. PAUL, THEODOR. Der Süßzingsgrad der Süßstoffe. [Sweetening power of sweetening materials.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 43: 137-149. 1922.



1528. S., T. The Hull meeting of the British Association. *Nature* 109: 784-786. 1922.—Advance notice, chiefly descriptive of the locality, is given.—*O. A. Stevens.*

1529. SMALL, JAMES. Notes on an easy method of camera lucida drawing. *New Phytol.* 20: 238-241. *Fig. 1-2.* 1921.—The image is thrown directly on paper, placed flat upon the bench, by means of a small right-angled prism.—*I. F. Lewis.*

1530. TAYLER, W. E. A national scheme for conservation of fodder. *Agric. Gaz. New South Wales* 33: 314-316. 1922.—It is advocated that the state purchase surplus fodder, such as alfalfa, in years of abundance, to be held for years of scarcity, and then to be resold to those needing it.—*L. R. Waldron.*

1531. WINTERS, S. R. Making tea from holly. *Sci. Amer.* 126: 181. 2 *fig.* 1922.